FOOD MANUFACTURE

Incorporating Food Industries Weekly

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FOOD MANUFACTURE

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The Editor will be glad to consider contributions from those engaged in the Food Industry. Articles intended for publication should be of a practical nature and accompanied by photographs or drawings when possible.

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FOOD MANUFACTURE

Vol. XVI, No. 3 March 1, 1941

Cold Storage Control

THE Cold Storage (Control of Undertakings) Order, 1941, made by the Ministry of Food, and the Cold Storage (Control of Undertakings) (Charges) Order, 1941, made by the Treasury, bring virtually all the stores capable of maintaining the temperatures needed for storing meat, butter and bacon within a comprehensive scheme of control. The Minister of Food has been given power to issue directions to cold storage undertakings concerning the commodities to be stored, the temperatures to be maintained, the method of storage, and the persons to be employed by them. The scheme also ensures to the controlled undertakings the minimum revenue necessary to keep them in efficient operation. The Ministry of Food is to fix cold storage rates for all Government-owned produce which, at present, forms a very high proportion of the total quantity of produce in cold storage. Individual undertakings will have to hand over to the Ministry any net revenue in excess of the minimum deemed necessary to maintain them in operation, this amount being based partly on the net cubic capacity of the stores. This fund is to be used to make up the deficiency in the revenue of undertakings which have failed to earn the minimum necessary for their efficient operation. The remainder is to be distributed, up to a maximum, to those concerns whose earnings are in excess of the minimum standard, while the balance, if any, is to be disposed of by agreement between the Ministry of Food and the Treasury. In order to ensure the smooth operation of the scheme, the Ministry of Food has invited the cold storage industry to select a small committee to collaborate with it.

Rebuff by Export Council

The Government appealed to British industry to form themselves into export groups. Amongst many that did so was a group of food machinery makers. They obtained recognition by the Export Council with, surprisingly, some difficulty, and were saddled with a somewhat unwieldy name which was not of their choice nor was it descriptive of their activities.

After a short interval they were invited to participate in the greater benefits of an amalgamation with a number of other groups. After six months of diplomatic pressure with meetings, conferences, manifestos (resignations of officials, including chairman, secretary, and committeemen), these manufacturers have for the second time voted for independence.

They are apparently numerically as strong as any original group and stronger than many.

The Export Council have now produced their hidden guns; have withdrawn recognition; and have informed the group that their certificate for export materials can only be obtained through the organisation they have so clearly refused to join. An official reason was, of course, given, but despite this these British manufacturers persist in wishing for autonomy, and if they cannot have it many will resign and relinquish their efforts in the export movement—an attitude which is fatally easy just now.

As one within the group said to us recently, "They" (the stubborn group) "haven't a chance. The Export Council have them cold, anyway." Which appears to be true, but it does not savour of democracy.

Labels from Straw

In the correspondence columns of this Journal this month will be seen the assertion that the label difficulty for the food industry has been solved by the use of paper made from straw. An interesting article by Julius Grant has been published in the December issue of *Agriculture*, in which he says that the sudden demand for straw for paper manufacture came as a pleasant surprise to some farmers.

Enumerating the advantages and disadvantages inherent in the different materials which might be used, the writer says that the best compromise points to the use of cereal straws. Their use for paper manufacture is by no means new; it has been known for over a century and has actually been in operation in Holland for many years. In Italy, prior to the war, several large factories working an up-to-date straw process were helping to render the country independent of cellulose. The characteristics of straw paper are described, and these suggest its suitability for the tin label. The technical limitations are such that only those mills which formerly made esparto paper (and possibly that from rags) have suitable plant, and even then the cost of manufacture is greater than that for esparto. The writer considers that, notwithstanding all this, straw has come to stay, at all events in the immediate future. He mentions that it has been estimated that straw, supplemented by rags and waste paper, will serve to supply some 65 per cent. of pre-war requirements. It is gratifying to note that the paper industry has already made a start towards the solution of technical difficulties by pooling its knowledge and organising its technical forces on a communal basis, with the object of dealing with problems of more immediate interest. There is a prospect that conditions which have arisen as a result of adversity may be turned to permanent advantage by the paper and agricultural industries.

Utilisation of Fish Cannery Waste

Developments in progress on the other side of the Atlantic are pointing the way to profitable utilisation of part of the waste products accumulating during the canning of shrimp, lobster, crab and other shell fish. In the past this was largely used, if at all, for fertilisers. The new policy is to extract the chitin, which constitutes a large proportion of the skeletal structures of these animals, and convert it into a form in which it can supplement or replace cellulose for many purposes—*e.g.*, the manufacture of films, textiles, varnishes and adhesives. Chemically, chitin is a polymerised acetyl glucosamine. Shrimp shells contain roughly 22 per cent. and crab shells 16 per cent., and it is isolated by a series of treatments with very dilute alkalis and acids. For most purposes it is desirable to remove the whole or the greater part of the acetyl groups in the molecule of chitin, and the resulting deacetylated chitin can be incorporated with alkali cellulose in the manufacture of a modified viscose. Of direct interest to food packers are transparent wrapping material and seamless sausage casings. The latter have been made from a chitin which has been xanthated with carbon bisulphide and then regenerated in a suitable coagulating bath. Since mixtures of cellulose with up to 25 per cent. chitin give a transparent sheet material equal, or superior, to ordinary regenerated cellulose, the subject is of interest in any event from the standpoint of economical utilisation of cellulose supplies.

"Food Science" in Court

We have received a number of enquiries during the past few months regarding the addition of saccharin to different foodstuffs, in connection with which the following case recently tried will be of interest.

A firm was summoned for selling "milk cocoa with sugar", with a label on the container calculated to mislead as to the nature, substance or quality of the contents. There was also a further summons for selling the contents with a label falsely describing them. A fine of £5 and costs was imposed. For the prosecution it was said that the carton of cocoa included a portion of saccharin and cornflour which were not included on the items specified on the label, and that the case was not an isolated one, as no doubt the firm had distributed hundreds of cartons with similar contents. For the defence, a plea of guilty was entered to the second summons and not guilty to the first, which was withdrawn.

It was submitted that this particular form of cocoa was evolved a few months before the war, and when hostilities broke out and the quota of sugar was cut down a proportion of saccharin was substituted. The manufacturers found that barley starch had to be added, with the result that the food value was improved. Sugar (it was contended) was a carbohydrate, and so was barley starch. Sugar, however, did not contain proteins but barley starch did. It was common practice in other countries to add barley starch.

The reason that the label came to be on the carton was that, following the outbreak of war, the original one, ordered for tins, which were later replaced by cartons, was used. Carelessness was mainly responsible, together with the outbreak of war.

Mr. Eric Voelcker (Public Analyst for Northants County) said that in the sample of milk cocoa with sugar submitted to him he found 17 per cent. of farinaceous matter, milk cocoa and sugar. There was under 10 per cent. of sugar, not sufficient to sweeten, and he found a proportion of saccharin.

He said that where saccharin was used as a sweetening agent it should be identified, except in the manufacture of mineral waters, in which it had been used for many years. In reply to the defence, he said that the starch was not "fatty" but was perfectly wholesome.

Do We Need more Calcium?

Of considerable interest, in view of the Government's intention to add calcium salt to white bread, is an article published in the *British Medical Journal*, 4175, by I. Harris, M.D., J. T. Ireland, B.Sc., A.I.C., and G. V. James, M.Sc., A.I.C., on Optimum Calcium Requirement. In the course of their comments, the authors state that "none of us remembers seeing a pathological specimen from an adult which exhibits a lesion in which calcium deficiency is a factor. Yet we are assured on the authority of Sir John Orr that in about half the population of this country the calcium intake is below requirements. In other words, every second person we meet is a victim of hypocalcæmia. All we can say is that since this type of malnutrition gives rise to so few manifestations it cannot be such an undesirable state to be in".

The authors conclude that there is no particle of evidence which suggests that the vast majority of the population of this country are suffering from calcium deficiency. Indeed, with a high degree of certainty it can be affirmed that the calcium intake under the present dietary régime is ample. On the other hand, a considerable amount of evidence exists that large sections of the population are in the habit of using too much of the type of food which is rich in calcium. There may be an indication for reducing the food calcium, but there is none at all for increasing it. Sir John Orr concedes that in half the population the calcium intake is satisfactory. This half will be suffering from the effects of hypercalcæmia if the calcium content in our diet is raised, as it would be if calcium salts are added to bread.

Referring to the above, in the House of Commons recently Sir E. Graham Little asked the Parliamentary Secretary of Food whether he was aware that a recent research based on experimental data threw doubt upon the assumption that there is a general deficiency in calcium in the people's diet and indicates that there is danger in increasing the calcium content in the manner proposed. Major Lloyd George replied that the results of the research work referred to were under consideration on behalf of the General Medical Council, but that it already appears that there are reasons for mistrusting the conclusions drawn from the experiments. We shall look forward to more information on this most important subject.

Confectionery Problems

Priority problems are still occupying the attention of the confectionery trade. A meeting of the Confectionery Trade Council, held in January under the presidency of Mr. Sydney Pascall, devoted itself for nearly three hours to the consideration of a number of matters appertaining to the trade's situation under war conditions.

There has been considerable talk about the undue stocking of canteens with chocolate, but Mr. H. E. Bailey, President of the National Union of Retail Confectioners, suggested that this widespread allegation was not entirely accurate. Mr. Pascall, however, said that he believed that there was ample evidence that the tendency was for canteens to be getting more than was their fair share.

A discussion on what was a "legitimate" confectioner, and whether cinemas, stores and others whose sale of confectionery might be classed as a "side-line", brought forth the suggestion that the precedent of the last war might be followed and the latter class of trader not supplied with stocks. The same suggestion was put forward in a meeting of the London and Suburban Branch of the N.U.R.C., and it was said that confectioners were seriously considering the possibility of selling goods other than confectionery in a sheer attempt at survival. Tilting at the manufacturers at still another meeting, Mr. Brookfield said that they (the manufacturers) appeared to be sitting on the fence, and no one could say what their policy was. If they would state clearly their position in the matter of diverting supplies from public-houses, cinemas and all other sources which have other means of earning a living, there might be some hope of getting somewhere. Councillor J. E. Thompson, speaking on the same subject, felt that if there was any genuine desire on the part of the manufacturers to keep the retailers' businesses in existence the case against the canteens should have been taken up with the Government by the M.C.A.

Facts or Fancies?

With reference to the now familiar "Food Facts" published by the Ministry of Food, a correspondent to *Time and Tide* wonders whether other readers are as indignant as she is and whether anyone can suggest how a protest should be made. "The 'Food Facts' or, rather, Fancies" (the correspondent writes), "have included suggestions for cooking watercress at a time of the year when this greenstuff is almost unobtainable; admonitions to make 'appleade' from apple cores, parings and water without any information as to quantities or reference to sugar; these hints are capped with a recipe for carrot-top salad, which includes lettuce and spring onion! Why not whipped cream and the whites of half a dozen eggs? one may well ask. Mrs. Beeton would provide equally good escapist reading without using up the nation's limited stocks of paper. It is high time that something was done." Without wishing to do the Ministry a bad turn by increasing its incoming mail, we suggest that the writer might make her "protest" direct, and as probably by this time she will have had time to calm down, that there is such a thing as intelligent adaptation of recipes. As a matter of fact, we have seen plenty of watercress and even some spring onions in the markets for some time, but it is the early bird which catches the worm.

The Vitamin C Content of Seaweeds

For many years after the antiscorbutic value of fresh fruits and vegetables had come to be universally recognised it remained a matter for surprise that Eskimos and other inhabitants of extreme northern and southern latitudes did not appear to be afflicted with scurvy, in spite of the almost complete lack of what had come to be regarded as essential antiscorbutic articles of diet. The mystery was cleared up some years ago by the discovery of the relatively high vitamin C content of many species of seaweeds, which are, of course, an important part of diet in the Arctic and Antarctic (and even in more temperate climes). In the case of *Fucus vesiculosis*, the common bladder-wrack so plentiful round our own coasts, we are fortunate in having a seaweed which is exceptionally rich in the vitamin. Recent investigations point to a maximum content (in September) of 77 mg. vitamin C per 100 gm. moist substance, while it falls to a minimum in December. Another species rich in vitamin C is *Porphyra umbilicalis*, which was found to contain an average of 83 mg. per 100 gm. when collected in May. These figures relate to seaweeds gathered in Scandinavian waters in recent years, and they certainly appear to justify an examination of our indigenous species from the standpoint of antiscorbutic value.

A curious point emerging from the above researches was that a discrepancy sometimes appeared between the vitamin C content estimated by the titration method with di-chlorophenol-indophenol and that obtained by biological assay. A striking example is the red alga, *Rhodymenia palmata* (particularly esteemed in northern latitudes). The titration method pointed to a vitamin C content of some 50 mg. per 100 gm., whereas biological tests (on guinea-pigs) indicated a figure of only 5 mg. per 100 gm. This discrepancy did not arise in the case of the species mentioned above.

Carrots

The importance of carrots in the diet, as providing one of the best available sources of vitamin A, is strongly emphasised in an unsigned article appearing in *Nature* for February 1. Theoretically, conversion of carotene into vitamin A should be accomplished without any loss. This is not the case in the human organism. Even when taken in the form of an oily solution, carotene yields only about half its weight of vitamin A to the system, and, in the case of either raw or cooked carrots, absorption may be provisionally estimated at about 20 per cent. On this basis, it is estimated that a daily intake of about 50 grams of carrot would be sufficient to satisfy human needs. As other foods containing either carotene or vitamin A are normally eaten, an allowance of carrots at the rate of 1 oz. per head per day should suffice to prevent vitamin A deficiency. The first sign of this deficiency is night-blindness, which may be followed, if the deficiency is considerable or prolonged, by xerophthalmia, but cases are on record where death has supervened before the manifestation of these lesions. Carrots may be more freely eaten when they are abundant, excess vitamin A being stored in the liver against future needs.

Canning does not destroy the carotene, but the practice of selecting immature roots, of pale colour and low carotene content, in preference to fully grown ones, deeper in colour and richer in carotene, is deprecated. But we are not certain if the writer is justified in stating that "the differences in flavour of young and mature carrots after canning are slight".

The utility of grated carrot in cake and pudding making is by no means unknown to British housewives, and the suggestion is made that, in addition to canning, another outlet for surplus carrots might be found in drying. The dried carrots ground into a fine meal might find a useful market for cake and biscuit making, or, alternatively, unground, might be cooked in the usual way. Drying need not seriously reduce the carotene content, but best conditions for obtaining optimum results need to be defined.

Banana Flour

Attempts have been made from time to time to cultivate a taste for desiccated bananas in the form of a flour suitable for breadmaking. The former German plantations in the British Cameroons did some work along these lines, and now we learn from *Brazil News* of the installation of a plant at Santos. Ripe bananas are dried and powdered by a process which does not destroy the cell structure and conserves the vitamins. The flour is put up in tins containing the equivalent of 5 lbs. of mature fruit, one tablespoonful representing one banana. Retention of the vitamin content is important in that banana flour is a useful source of at least one member of the B_2 complex, recent work having revealed a riboflavin content of 0·84 mg. per kilogram of the raw fruit.

It will be recalled from the wholemeal bread controversy that both vitamin B_1 and B_2 are lacking in white bread. Tinned banana flour may well prove a profitable subsidiary product of the banana plantations and our own West Indian growers are presumably alive to its possibilities. The saving in shipping space is another point in its favour.

Bacteriology of Ice-Cream

The Burri smear culture technique, which has been extensively used in connection with the investigation of bacteria in milk, has been successfully adapted to bacteriological examination of ice-cream by H. F. Long and B. W. Hammer, *Iowa State College Journal of Science*, **14**, 163, 1940. The samples of ice-cream are picked with a sterile platinum needle under a low power binocular, and each specimen is spread over a dry agar slope; the medium and culture conditions are the same as for milk.

The method was applied to packaged and dipped ice-cream to ascertain sources of contamination and relative bacterial count of interior and surface layers. It has been found that bacterial counts by this method are not in close agreement with plate counts. While the Burri count is usually higher than the plate count, it is sometimes lower, and as plate counts are not numerically accurate as to numbers of individual organisms the differences are not surprising.

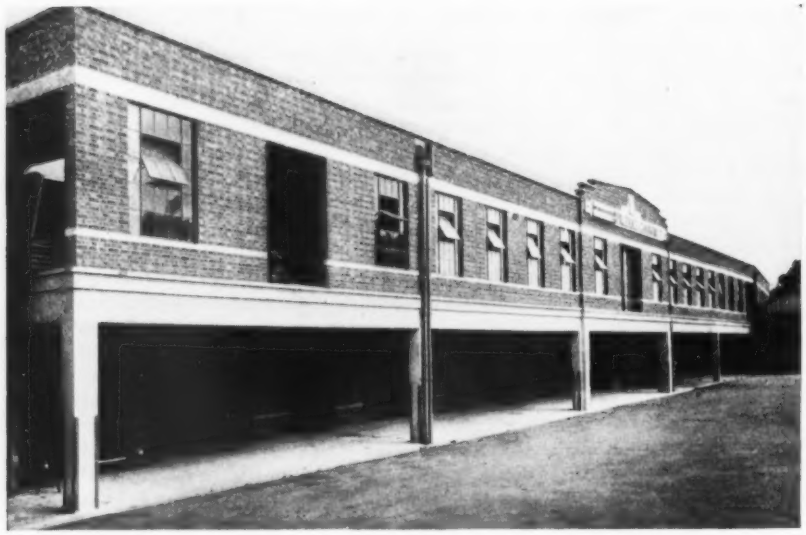
The main advantage of the Burri technique for ice-cream is that it gives useful information regarding distribution of bacteria. The method is also used for tracing causes of contamination in package ice-cream.

Sugar Exports

The International Sugar Council, at a recent meeting in London, when delegates representing 76 out of the total 100 votes were present, re-elected General Sir Hugh Ellis (cheif British delegate) as Chairman and Dr. G. H. C. Hart (head of the Netherlands delegation) as Vice-Chairman for the current quota year.

The delegations present were unanimously in favour of carrying on the International Sugar Agreement, and formally adopted various decisions reached at an informal meeting on August 23, 1940, including a decision that, without creating a precedent, the export quotas for the free market adopted for the third quota year ended August 31, 1940, should be maintained for the fourth year ending August 31, 1941, instead of reverting to the larger basic quotas. This decision, however, is subject to review should there be a radical change in the world situation during the course of the quota year, and was also subject to confirmation by one delegation which was awaiting a cablegram from its Government.

A sub-committee was appointed under the chairmanship of Dr. G. H. C. Hart, and consisting of representatives of the Australian, Cuban, Dominican, Netherlands, United States and United Kingdom delegations, to study the present and post-war general and statistical position of sugar, and to report to the next meeting.



The building of this new fruit and vegetable cannery was started in March, 1940, and was in full operation on June 7 of the same year. The covered way, extending along the whole front of the building, is used for the reception of fruit and vegetables, and above it is the empty can store.

BRITISH WAR-TIME CANNING MARCHES ON

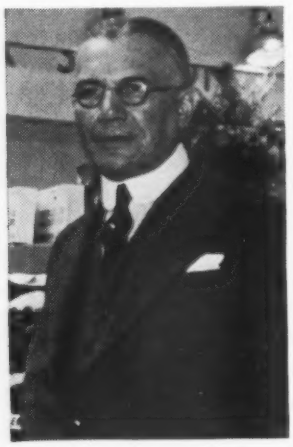
A description of the new fruit and vegetable cannery of WISBECH PRODUCE CANNERS LIMITED.

ONE of the most remarkable examples of the birth and growth of a new industry is undoubtedly that of British fruit and vegetable canning. Although small concerns had been canning for a considerable time, the real start of the industry dates back to 1924, and the industry went through the growing pains inseparable from extreme youth. As in the case of a gold boom, novices and optimists rushed into business eager to cash in on the new stunt, which on paper showed excellent profits and was apparently the easiest thing in the world to work. What more simple than to put fruit into ready-made cans, fill them with syrup, close them up with machines, and put them for a time in hot water to effect what the scientific people called sterilisation, and—*voilà tout!*

Start of Pea Canning

S. W. Smedley was one of the early pioneers of that time, and also one of the optimists. But there are optimists and optimists. Whereas probably the majority of the early venturers are long forgotten and their efforts resting among the limbo of the what-might-have-beens, the name Smedley is a household one from Land's End to John o' Groats.

When he started canning fruit—vegetables came later—he personally had very little knowledge and no practical experience of canning. The first thing he did was to send his son, W. V. Smedley, to the United States for a year, where he worked in three different canning factories, not only to learn the A B C of the industry, but, once this was done, to purchase plant and equipment. Immediately on the return of young Mr. Smedley pea canning was started, and peas have continued through the years to be the backbone of the business. It was the first mass-produced canned product that was put up, and it was from this beginning that the whole range of Smedley's canned vegetables gradually evolved.



Smedley—*père.*

Smedley—*fils.*

Continued Progress

Evidence of the continued vigorous growth of the concerns controlled by Smedley may be seen in the handsome new factory built last spring by the Wisbech Produce Canners Limited.

Of rustic brick, Bath stone and concrete, it embodies improvements resulting from long practical experience. This new factory is working in addition to the pea-canning factory, which has been working for about ten years and turns out throughout the season 300,000 cans of fresh peas per day.

The pea factory backs on to the new building, and in all there are no less than 15 acres occupied by buildings housing plant in full production.

In the new building the preparation is carried out on the ground floor, which houses the different canning lines for fruit, solid apple pack and vegetables.

For the canning of fruit there are five straight lines consisting of grading tables, syrupers, clinchers, exhausters, seamers and coolers, which are capable of an output of some 5,000 to 6,000 cases per day.

The solid-pack apple line is capable of handling roughly 30 tons of apples per day.

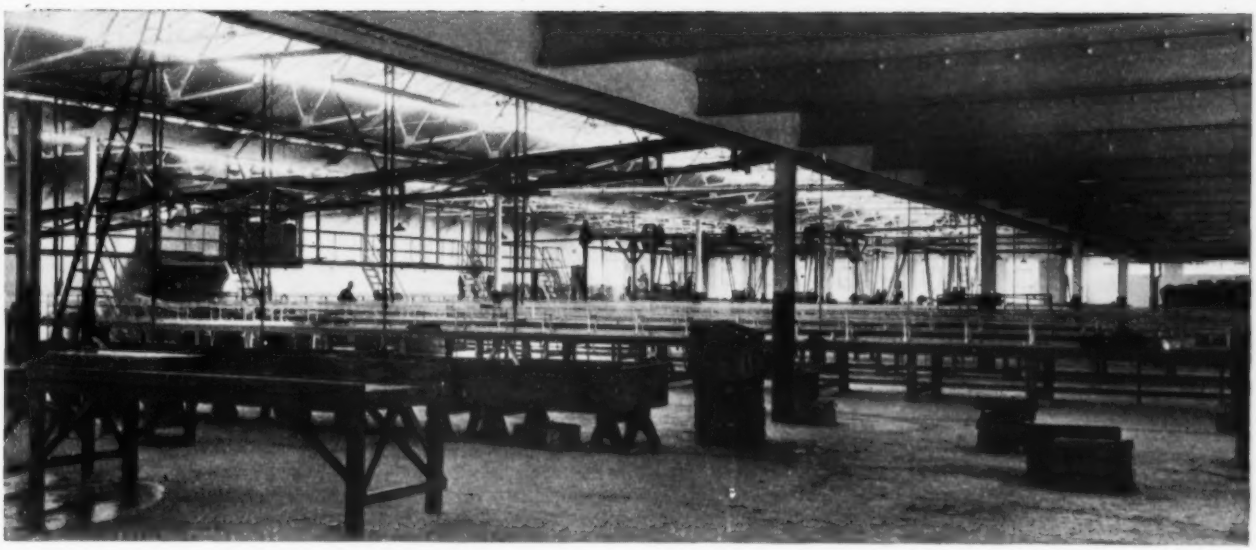
Sundry automatic lines deal with diced vegetables, whole carrots, celery and soups.

The whole of the plant devoted to soup canning was evolved and constructed in the Wisbech works. It has a capacity of 48,000 cans per day, and at the present time six varieties are processed on it.

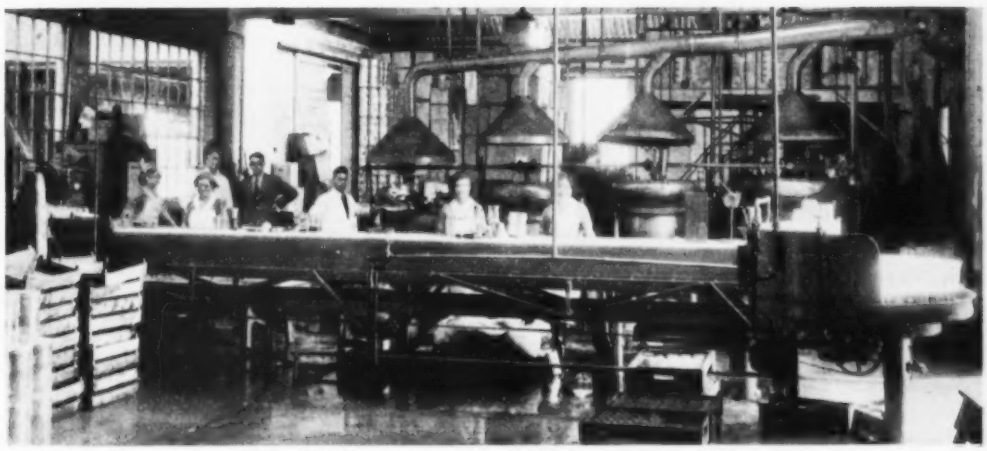
Conveyor System

An especially interesting feature of the fruit line consists of some fruit-preparation tables, in which are incorporated con-

(*Continued on page 56*)



The new factory ready for work on June 7, 1940.



The Jam Department.

The new factory at work on June 14, 1940. Note "catwalk" on left, with control office on extreme left. All machinery is at the far end of the factory, away from the workers.

WAR-TIME FOOD REFRIGERATION

This article, written by a well-known cold storage expert, forms a critical review of the situation with regard to food refrigeration since the beginning of the present conflict

ON August 4, 1914, the British nation took sides with an outnumbered France and made its stand in the way of a Germany resolved on expansion at all costs. Probable attempts at invasion had been discussed in the Press for some years, if ever war came, but the real nature of their peril was not understood by the majority of English people. " For should the naval situation deteriorate sufficiently to make sustained invasion possible, no invasion would be needed to bring England to her knees. For three almost out of every four mouthfuls that sustained her Britain was dependent on sea-borne food. And her rulers, in conformity with national economy, which left such matters to private capital, had omitted to lay in any reserves. In 1917 Britain was within an ace of starvation because her people, in pursuit of profits from foreign trade, had become dependent to an unbalanced degree on foreign food."*

At one time, when the German submarines were sinking half a million tons of shipping a month, there was less than seventeen days' supply of food in the country.†

After 1914

During the years following the War to End War England reverted to its economic *laissez-faire* and to still further disinterest in the development of her fertile land. England had not learnt her lessons from her past mistakes. Eighteen months after the outbreak of the Second War the same danger of food shortage threatened her again because, while spending £1,500,000,000 on rearmament when the probability of a second war was recognised, no adequate meat reserve nor adequate reserve of grain for human and animal consumption was provided for.

About half a dozen people had, some four years previously, considered the necessity of compiling a Register of Cold Stores, giving full information on the capacity and possible use of all cold stores in the country, with a view to working out the quantity of various foodstuffs which could be accumulated in cold storage as reserve against emergency. A questionnaire to be sent to all owners of cold stores was drawn up to this effect, but was shelved by a Government Department.

Meat Reserves

A certain quantity of meat reserve had accumulated in cold stores by 1939, but was not a quarter of the amount which could have been stocked if the storage question had been tackled efficiently and in time. For the amount which can be accumulated is the difference between the amount consumed and the amounts produced at home and imported; the latter is dependent on the tonnage of refrigerating shipping available, and no programme of intensified construction of refrigerated ships had been embarked on during the years prior to the war. One way of building up a reserve was to curtail the consumption—*i.e.*, by the introduction of rationing. (Stocks of tinned meats accumulated which could be carried in non-refrigerated ships.)

All our ports were accessible to shipping, but stocks did not increase, for troops are allowed much more food than civilians, enemy submarines were taking their toll of shipping, supplies from certain countries diminished or stopped altogether. The general public was under the impression that the Ministry of Food was in control of all food supplies, all food stocks, and all cold-storage space, yet round Christmas and in January, 1941, one witnessed the sore spectacle of turkeys, chickens and rabbits being put into cold storage by speculators who would not sell at prices fixed by the Ministry of Food (and that at a time when the meat ration was reduced to the lowest quantity yet fixed), into cold stores which should have been filled to capacity with food reserves.

* Arthur Bryant, *English Saga (1840-1940)*.
† Lord Lymington, *Famine in England*.

Slowly Frozen Meat

The convoying of ships and other war conditions increased the time refrigerated ships took over their journey beyond the limit chilled beef can safely be kept. The expedient was resorted to of reducing the temperature of the meat as low as possible on board ship and continuing the process of freezing in cold stores after arrival in this country. Thus chilled meat was no longer available, and in its place people were served with slowly frozen meat, which is generally not only tough and tasteless, but has lost appreciably in nutritive value by the time of cooking, due to excessive loss by drip during thawing. Experts on nutrition worked out the quantities of foodstuffs necessary to give a working adult the required energy units, and meat rationing took this into account; but the loss in nutritive value of slowly frozen meat did not enter into their calculations. On this inferior diet workpeople labouring for longer hours and in many cases for seven days a week could not maintain the standard of output which was expected.

While foodstuffs for civilians are being rationed and still further reduced, we find the anomaly of troops being supplied with three and a half times more meat, with more margarine, cooking fats, cheese, etc., than civilians. It is obviously absurd to contend that a soldier needs many times more food than a munition worker, a miner, an agricultural labourer or other people engaged on hard manual work, and it can be proved that a considerable amount of food, rationed for the civilians, is wasted in Army units. The case of the Home Guards may be cited. To-day these men have to manage on the same rations as civilians; to-morrow they may be on duty with the Regular Army, when they will be supplied with many times more food. Can this be justified? If not, neither can the method of rationing civilians.

Rationing Anomalies

Rationing, we were told, was introduced so that no person should be able to obtain more than any other, yet those who can pay for it and those fortunate to be employed in certain localities can obtain extra quantities of rationed foods at restaurants, canteens and luncheon clubs. All this is an extra drain on available supplies. Meanwhile a great number of people are unable to get their rations at all, this shortage occurring especially in country districts. One instance is a small country town on a main road, nine miles only from the county's supply depot, and it cannot be said that transport difficulties due to snow and bad weather were responsible. The villages in the district suffered similarly. In districts such as this one it is impossible to obtain fresh fish, which is available in towns and helps to supplement the ration.

Many a family in country districts has been short of substantial foodstuffs these last few months. It has been reported* that Lord Woolton " nosed around, not as Minister of Food, but as an ordinary citizen, to see what the food position was ", and that he found that people did not find all they wanted in one shop, but, he was given to understand, they did get sufficient by moving from store to store with their shopping basket. Lord Woolton must have been misled or did not " nose around " in the districts (which can be named) where shopkeepers who have the goods refused to sell bacon (before rationing), dripping, eggs, cheese, biscuits, sausages and other goods of which there is a shortage to people not registered at their shop. Why should the Minister of Food have to " nose around "? Can he not get reports on the true state of affairs from his local officers, or is it that some of these are otherwise too busily engaged as would appear in the case of one, probably out of many, who is food officer, clerk to the council, clerk to the rating authorities, billeting officer for the reception area, and has his private business as solicitor at the same time?

* *The Times*, February 1, 1941, page 5.

The Food Position To-day

What is the food position to-day? Full information can obviously not be published.

To what extent did our Government do their duty to the nation by providing food reserves, ensuring the continuation of supplies, safeguarding the food against deterioration and preventing wastage? Some of the facts can be made known.

After the outbreak of war the nation was given to understand that there were ample reserves of essential foodstuffs. Where were they? In his address to the British Association of Refrigeration on November 28, 1940, Lord Woolton said that when war came we found ourselves short of cold storage, and he wished that those responsible had had more foresight.

Ministers come and go. Permanent Government officials stay on; those in charge of the organisation of the machinery dealing with our food reserves stay on.

Cold Storage Capacity

The question of information on the cold-storage capacity of the country was considered by the Food (Defence Plans) Department some three years before the war. The official dealing with this was given a copy of the questionnaire previously drawn up, but it was not till some time after the outbreak of war that owners whose cold stores were not already partially stocked with reserves were asked to fill in forms simply giving details of capacity, temperatures and what the stores were used for.

The original questionnaire asked for information on some forty items relating to buildings, cold-storage rooms, plant and equipment, and would have given a comprehensive picture of the capabilities and the state of all stores in the country.

Questioned on what the Food (Defence Plans) Department proposed doing about a register, the official replied: "We could not possibly send out a questionnaire like that; we are sure that the cold-store owners would not give the information." The fact is that the officials would not have known how to interpret the answers and that they did not understand the purpose of all these questions.

The person who drew up the questionnaire was never given an opportunity to outline its full purpose. He foresaw the possibility of damage to stores and to essential utility services by air raids. The answers to some of the questions would have revealed the necessity for the provision of—

alternative access;
alternative source of motive power or energy supply;
alternative source of water supply for condensers;
duplication of refrigerating plant to be located as far away as possible from existing plant;
overhaul, repair or renewal of plant or parts thereof.

The answers to other questions would have shown the necessity for—

renewal of insulation;
increasing the thickness of insulation for the maintenance of lower temperatures;

and coupled with an inspection of the actual stores it would have been possible to state which foodstuffs could safely be stored in each room without danger of deterioration.

Cold Store Reserves

Officials inspected a number of cold stores to be used for reserves, but the inspection was carried out on the lines of Lloyd's Surveys. There was no inspector with sufficient experience and qualification to say, on inspecting a store, whether foodstuffs kept therein would after a time suffer deterioration due to one or more of the various factors causing wastage.

Not only has deterioration in cold storage to be taken into account, but also wastage in butchers' shops necessitated by trimming of unsaleable parts of meat and by consumers before or after cooking, all due to cold-storage conditions. The same remarks apply to tainted butter, cheese, bad eggs, etc., supplied to consumers these last six months.

It was pointed out to two consecutive Parliamentary Secretaries to the Ministry of Food that £1,500,000 worth of cold-stored meat could, per year, be saved from deterioration at an expenditure of £18,000, but no details of the proposal as to how to effect this saving were ever asked for.

New Cold Stores

Attention was drawn in June, 1937,* to the unsuitability of a number of cold stores for storing reserves. Several of these could have been reconditioned and be made suitable; nothing was done. In January, 1940, the Government made it known that they were considering the erection of several new cold stores. Time passed. The erection of a further number of stores is now being considered of a total capacity of 5 million cubic feet, which, if the scheme goes through in the usual way, may be completed before the end of 1941, but it might be some time in 1942. This extra space and more could have been available a year before the outbreak of war if some of the existing cold-storage buildings had been re-equipped, and the work would have been carried out at less expense than the cost of these new stores. Moreover, this extra space could have been stocked with reserves if shipping had been provided for at the same time, as the sea routes were then free.

Cold Storage Advisory Committee

The Ministry of Food appointed a Cold Storage Advisory Committee to assist the Director of Cold Storage at the Ministry. The Committee consisted of seven members, six of whom were connected with cold-storage concerns or with makers of refrigerating plant and the other the Secretary of the British Association of Refrigeration. The Committee had met three times before the end of 1940, and had on no occasion been consulted on matters relating to the construction of the new cold stores, nor had the Ministry, notably lacking in expert staff, consulted experts with experience in the design and construction of improvements in cold storage, ensuring the elimination of deterioration and wastage.

Are these new stores really required? Shortage of cold-storage space is the reason given, yet, taking one case as an example out of many, we find that, in this cold-storage building serving as distributing depot for a large area, space is occupied for the cold storage of fish, poultry, meat, butter, and furs and fur coats belonging to shops and residents of the district. The space allocated to meat is not sufficient, with the result that a number of butchers are often without meat for two or three days till the depot has received a further supply.

Twelve miles away in the country there is a cold store used for only five months a year for the storage of apples, with all rooms fitted as gas stores, perfectly suitable for the storage of furs, fur coats, eggs and poultry, which could be transferred to this country store, making more space available at the depot. If the roads from the large coastal stores to this depot were blocked by the invading enemy, not enough meat could be supplied from this depot for one week's ration to the population in the district. It is hoped there are iron rations available.

Foodstuffs for Cold Storage

When the new cold stores are completed, where will the foodstuffs come from to fill them? No doubt a number of refrigerated ships have been lost in the course of their regular journeys from meat-supplying countries. Some time ago the Minister of Food told us that meat rations were to be decreased as a number of refrigerated ships had to be used for the transport of supplies to fighting forces in Africa and Greece. We were also told that butchers who could not supply the full meat ration would be able to supplement it with tinned meat. It has always been understood that the tinned meat was part of the emergency reserve. If we are drawing on our reserves, and as the shipping lost at sea is not being replaced at the rate it is lost, how are the new cold stores going to be filled?

If it is said that the new stores are to receive the goods, or what is left over, from stores damaged by enemy action, then space can be found in existing cold-storage buildings which can be reconditioned in a much shorter time than it will take to complete the new stores, or in stores now used for non-essential goods.

The butter ration has also been cut, presumably due to the same causes. Cheese is unobtainable in some parts of the country, in others only small amounts are available. It is true that practically no English cheese is made during the winter months, but it is also true that the appropriate Government Department did not make provisions for sufficient space suitable for long-term storage of cheese. The same applies to other staple foodstuffs.

* John J. Piqué, "The Storage of Food for the Emergency of War", FOOD MANUFACTURE.

Fish Storage

Fish shortage all over the country is another instance of lack of vision and unpreparedness. Mr. David Robertson, M.P., on more than one occasion told the House of Commons of the proposals he put before the Ministry of Food, before and since the war, to ensure a reserve and a steady supply of frozen fish from Canada and Newfoundland. Nothing was done. When a large stock of frozen fish had accumulated at Newfoundland it could not be brought over here as there were no refrigerated ships available.

A nation which now spends £7,000,000 a day on armaments and war necessities would not find £10,000,000 spread over two years for the construction of sufficient refrigerated ships, refrigerated railway vans and lorries, and the renovation of cold-storage depots. With this sum the appropriate trade organisations would have completed the work in time to have provided a huge reserve of all essential foodstuffs, but only the trade organisations could have completed this task in time, and, as is well known, such a course cannot be tolerated by Government Departments.

Home-Killed Meat

The way our scanty supply of home-killed meat is dealt with also shows lack of preparedness or of efficiency, for a great number of Government licensed slaughterhouses are not equipped with adequate means for extracting the animal heat out of the slaughtered meat. Many butchers have repeatedly been supplied with meat still warm, and, as any butcher or cook knows, this leads to deterioration and wastage.

The waste of Food Order, 1940, made it an offence to waste food, but apparently only visible wastage is an offence. Wastage due to storage conditions as mentioned previously, and wastage resulting from insufficient cooling, are probably far greater in quantity than the aggregate of individual household wastage. We quote from *Modern Refrigeration* :*

" It is not a crime, we presume, to waste food, but to be caught wasting food. For there are many big agencies of food wastage, and we strongly suspect that the greatest of these is the Government itself.

" The reason we venture this statement is our knowledge of the equipment with which the Government is content to go into business as a meat supplier. It is now, of course, the one great seller of meat to the public, and it transacts this big trading operation with an equipment in the way of slaughterhouses and meat depots the majority of which any ordinary trader would promptly condemn as unfit. For no meat trader will allow that a modern abattoir is fit to run without a cooling room for removing the animal heat of the carcases, and how many, we ask, of the odd establishments now being used have this chilling equipment? The strain on their accommodation must be very great, for they entirely replace the slaughterhouses formerly used in peace-time operation of the home meat trade of this country. Then there are the meat depots. These are, it is true, only intended for the momentary assemblage of meat on its way to the butchers' shops. But where is the system, we would ask, which in ordinary functioning works without a hitch? We are convinced that there must be innumerable cases where the delay of some hours must occur in meat consignments travelling between wholesale and retail committees, via the meat depot, which in the majority of cases is a motor garage or some such structure never intended for meat accommodation or protection. Therefore we state our strong suspicion that, with all this inadequate equipment in a nation-wide business in perishable produce which demands the fullest protection against exposure and contamination, the Government must, in effect, be the greatest food waster of the realm. Will time prove this? Will the account of wastage ever truly appear? . . .

" No, we do not think that any startling figures of extra meat wastage this season will appear in the periodic returns, but we are convinced that such an increase cannot be avoided under the conditions now ruling in this national business, and, as we have said, we are of opinion that the Government is responsible for this state of affairs. . . ."

It would be interesting to know whether records of deterioration and wastage from all sources have been kept since the Ministry has had control of storage, supplies and distribution, and, if so, what the figures are.

It is an offence to waste food. To let food, brought here at the peril of our seamen's lives, go to waste is a crime. Wastage of food is wastage of our much-needed financial resources.

* *Modern Refrigeration*, August, 1940, pages 156-7.

Whatever the present position of stocks and supplies of imported staple foods is, the position could have been infinitely better.

Economy is without reward, inefficiency goes unpunished.

British War-Time Canning Marches On

(*Continued from page 52*)

veyor systems designed and made in the factory itself. By means of this system four sizes of cans are able to be filled on one table, and the cans taken by one conveyor to each of their appropriate seaming and processing equipment. This is especially useful when such fruit as strawberries is being handled, when the small fruit is packed in " Picnic " cans, the medium-sized fruit in " E 1's " and the large fruit in " N 2's."

Factory Control Office

The factory control office is a feature of this department. Built about 9 feet above floor level is an office with glass windows, commanding a view of the whole plant. Running on each side of this office is a steel gangway suspended from the roof, with access from the office. This gangway facilitates the Manager's movements from one end of the factory to the other, and relieves him from the necessity of climbing over plant in order to observe the progress of the work. This " catwalk ", as the people in the factory have christened it, comes in very useful when showing parties of visitors over the factory, as they are able to see all that is going on without impeding the work in progress.

In addition to these units there are the quick-freezing plant and the jam-making factory, which are also in the same block.

The warehouse, which is capable of holding upwards of a million cases of goods, is situated on the ground floor of the new building, and has been designed without partitions, thus economising space and rendering supervision easy of accomplishment.

Quick Freezing

The following note on quick freezing is in Mr. W. V. Smedley's own words, and will be interesting as showing a canner's reaction to the latest mode of fruit and vegetable preservation :

" One might have supposed that the war would have acted as a very effective damper to the sale and progress of this new method of food preservation, the thought itself being prompted by an idea that these are ' luxury ' goods. They might rather be described as ' luxurious ' as far as quality is concerned, but, from the point of view of price, not so. They are little more expensive than canned goods as far as vegetables are concerned. For instance, a tin of garden peas costing 7d. would cost 9½d. for a similar quantity of quick-frozen peas. The increase on pre-war cost of quick-frozen vegetables as far as my own lines are concerned is considerably less than 10 per cent. Having regard to the above facts, it should not, therefore, be surprising that the public are, in fact, consuming more quick-frozen vegetables and fruit than they were a year ago. That is a fact.

" There is one side to quick freezing which has, however, suffered inevitably, and that is the putting into effect of the fruits of research and so improving and cheapening the manufacture. Just before the war commenced some important research on the problem of freezing more quickly and more economically had been completed. Had the war not intervened, we should have embodied in machines the principles discovered last summer. These machines were to have enabled us to cut down the freezing-time to a matter of minutes and also to have cut down the actual cost of freezing considerably."

LIST OF SOME SUPPLIERS TO WISBECH PRODUCE CANNERS

Air-Conditioning Plant : *Sturtevant Engineering Co., Ltd.*
Jam-Making Equipment : *Wm. Brierley, Collier and Hartley, Ltd.*
Refrigerating Machinery : *York Shipley, Ltd.*
Retorts : *A. Dodman and Co., Ltd.*
Special Machinery for Handling Gooseberries and Apples : *A. and G. Cooper.*

FROZEN FISH AND ITS PROBLEMS

Unless certain precautions are taken, peculiarities develop in frozen fish which, although not rendering it unwholesome as food, nevertheless make it distinctly unpalatable and inferior to fresh fish. This article discusses the different means taken to ensure that frozen fish is of the highest possible quality.

Dr. C. L. CUTTING,

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THE decrease in home landings of fish during the present emergency has accelerated the growth of interest in frozen fish imported from the Dominions and elsewhere. It is therefore opportune to recapitulate the experimental findings of the past few years of research into problems connected with the general treatment of frozen fish. Of all preservative treatments, freezing and cold storage alone retains the processed fish in a state strictly comparable with fresh. However, unless certain precautions are observed, peculiarities develop in frozen fish which, although not rendering it unwholesome as food, nevertheless make it distinctly unpalatable and inferior to fresh fish.

Fish for Freezing must be Fresh

In the first place, the fresher the fish when it is frozen, the better. Under no circumstances is fish improved during cold storage. Fish that is stalish when frozen will deteriorate still further when subjected to freezing, cold storage and subsequent thawing. For the best results all fish should be frozen before *rigor mortis* has passed off—*i.e.*, within 24 hours in ice after catching (18 hours in the case of herring). Fish frozen during *rigor* are very frequently still stiff when thawed out, even after six months, if stored at a very low temperature such as −22° F. (−30° C.).

Smoke cures made from such fish are scarcely distinguishable from those made from fresh fish, considering evenness of cut and thickness and gloss of pellicle, which constitutes an excellent criterion of the extent of denaturative and other changes in the proteins during cold storage. A series of haddocks, stored for periods up to 14 days in ice before freezing, shows a quite definite gradation, raggedness of cut and gaping flakes and poorness of gloss, becoming more marked the staler the fish. In addition, the staler the fish before freezing, the more noticeably odd become the flavours and odours, although these are not necessarily putrefactive ones.

Factory Ships

For countries with near and abundant fishing grounds this first requirement for good quality frozen fish can be met without difficulty by shore freezing stations. In this country there is no point in cold-storing fresh fish when it can be consumed as such. On the other hand, since the last war the nearer grounds have been increasingly overfished, an ever-increasing effort having to be exerted to maintain the weight of fish landed, which were of decreasing average size. This in turn led to the more powerful ships, fishing distant grounds, being longer away from port and spending a greater proportion of that time steaming. Since the journey to or from the northernmost fishing grounds took 5 to 6 days, the limit of ice as a preservative for fish—viz., 14 days from catching at the outside—was exceeded for the earliest part of the catch, and increasing quantities of fish from the distant grounds were being landed in poorer condition and being condemned at the port.

Freezing aboard factory ships fed by fleets of trawlers away from port for months at a time has so far on trial presented difficulties. An alternative solution is to equip trawlers for freezing at least the first portion of their catch. This has been taken up with apparent success in a number of foreign countries.

Conditions during Storage

Next in importance to the freshness of the initial material are the conditions during storage, which usually far exceeds in duration all other stages in the refrigeration chain. Given fresh fish, the factor of overriding importance, if a first-class product is desired, is the temperature of storage. Multiplication of bacteria is inhibited below about 14° F. (−10° C.), at which approximately 90 per cent. of the 80 per cent. of water constituting fish muscle is solidified. Enzymes continue to work with adverse effects in the hard frozen muscle at even lower temperatures, the rate of change, as is usual with such reactions, being reduced to approximately one-half to one-quarter for every reduction of 18° F. (10° C.), although presumably below the eutectic point, estimated at about −67° F. (−55° C.), below which no liquid at all is present in fish muscle, all action should be suspended and, save for reactions, chemical and physical, in the solid state, the fish should keep indefinitely in perfect condition. Such temperatures, however, are not yet within commercial practicability.

The majority of cold-stored fish in this country is still kept at temperatures around 14° F. (−10° C.). At this temperature, which is sufficiently low to keep meat in excellent condition for several months, all species of fish noticeably deteriorate within a few weeks, and after two to three months have become definitely distasteful (though not in the sense of being putrid or unfit for food) both in flavour and texture, and there are considerable losses of juice in handling the thawed fish.

Activity of Enzymes

The probable reason why the enzymes of fish are still quite active at such low temperatures is that they have a considerably lower normal working temperature than those of warm-blooded animals. In herrings and other fatty fish rancidity of the oil develops in addition, due also to enzymic action, and this still further decreases the storage life. At around 14° F. (−10° C.) "rust", a yellowish, malodorous product of the breakdown of fat, appears after a few months on the surface, particularly around the bases of the fins, principally of fatty species, but also on moderately fatty fish, such as halibut, plaice and lemon-soles, and even on haddock.

In commercial stores, most of which probably run at relative humidities of between 80 and 90 per cent., fish can be considerably desiccated, resulting not only in loss of weight (which amounts to about 3 per cent. per month for fish stored in boxes and is as great as 10 per cent. per month for fish exposed directly to the air of the store, particularly in a draught as from a fan), but also deterioration in appearance, owing to "freezer-burn", a trade term for the hardened, wrinkled patches caused by superficial drying.

Further, the action of the catalytic system promoting rancidity is accelerated by the concentration of salts, natural and added, as in smoke-cured or brine-frozen fish, in the surface layer, where most of the fat is deposited. All frozen fish should be "glazed" by immersion in water to form a film of ice before storage, and frequent reglazing would avoid these changes due to drying.

Wrapping Materials

The same may be said of the use of wrapping materials impermeable to water vapour. Among such materials which have been tested, including vegetable parchment and certain viscose preparations, only waxed paper is found appreciably to decrease drying; when backed with aluminium foil, evaporation during cold storage is almost entirely prevented. However, neither of these treatments affects the development of "cold-storage" odours and flavours and textural breakdown.

At one time it was commonly held that low temperatures were actually harmful to fish, but work in recent years has established quite definitely that quality is improved by lowering the temperature of storage, at any rate down to −22° F. (−30° C.). No damage to tissues was detected by tasters when the temperature of fish had been lowered to −65° F. (−54° C.) during freezing.

Storage Life

Table I indicates the storage lives of frozen fish at various temperatures. It will be seen that the rate of all deteriorative change is reduced for all types of fish, white or fatty, fresh or

TABLE I

STORAGE LIFE OF COLD-STORED FISH

Figures in roman type give the approximate period at the end of which the product is still, if not quite as good as fresh, in really good condition. Figures in italics give the period, still more approximate, at the end of which the product is definitely distasteful to persons accustomed to "fresh" as standard and approaching indebility.

Type of Fish.	*Temperature of Storage.*		
	14° F. (– 10° C.).	– 4° F. (– 20° C.).	– 22° F. (– 30° C.).
White fish (gutted) ..	1 month *4 months*	4 months *15 months*	8 months *> 4 years*
Herrings (ungutted) ..	1 month *3 months*	3 months *6 months*	6 months *> 1½ years*
Smoke-cured white fish ..	1 month *3 months*	3½ months *10 months*	7 months *> 1 year*
Kippers	3 weeks *2 months*	2 months *5 months*	4½ months *> 9 months*

smoke-cured, by lowering the temperature of storage to – 4° F. (– 20° C.), and that there is still more remarkable improvement at – 22° F. (– 30° C.). In addition, evaporation losses are reduced to about 1 and 0·5 per cent. per month respectively, at the lower temperature reglazing being unnecessary for all normal periods of storage. Lemon-soles after four years at – 22° F. (– 30° C.), although easily distinguishable from really fresh fish by the characteristic flavour of the latter, are still edible and indeed palatable, and in every way superior to fish on a fishmonger's slab which has been previously kept, say, 14 days in ice, even under the best conditions before landing. Kippers made from herring stored for 18 months at the same temperature can still be eaten with enjoyment, even though the fat in the lateral brown streak is definitely rancid. Similar conclusions apply to smoke-cured fish.

Curing after Storage

Investigation has shown that a better product is obtained by storing "round", unsplit fish and curing after storage than by storing the smoked fish, although the latter is still the course adopted by the trade. Another feature is that fresh fish frozen split yield a smoked product somewhat inferior to fish split after thawing, due to superficial changes during freezing and also evaporation occurring at the cut surfaces, although in the case of herring which are stored ungutted the latter procedure yields a considerably greater proportion of kippers with torn belly walls, due presumably to softening by enzymic digestion even at – 22° F., which are ranked as "seconds". With smoke-cures such as "finnan" haddocks, that are split down the belly, this consideration does not apply, and since also the appearance is not usually camouflaged by means of dye, as is the case with kippers, for a first-class product it is advisable to freeze "in the round".

Rate of Freezing

The third factor in order of importance in the freezing of fish is the rate at which it is frozen, usually expressed as the "freezing-time", or the time taken for the thickest part to pass through the critical interval 32° to 23° F. (0° to – 5° C.), at which deteriorative change is most rapid and in the course of which about 85 per cent. of the water in the muscle is frozen out. Mainly as a result of histological work, a critical freezing-time for animal tissues was fixed at 35 minutes, the argument being that the size of the ice crystals formed is inversely proportional to the rate of freezing, and that when freezing is slower than this critical rate the size is of a greater order than that of the cells, with the result that the cell walls are punctured and also water is withdrawn by osmosis from the protoplasm inside the cells, and on thawing is not reabsorbed, greater drip thus resulting from slow freezing, and texture also being broken down.

"Rapid" Freezing

"Rapid" freezing, defined as at or quicker than this critical rate, has been, perhaps, overemphasised as the sole factor of importance, to the neglect of the other two factors previously dealt with. Certainly for the very best product—*e.g.*, for fish that will meet the high requirements of a smoke cure—quick freezing is still essential even at temperatures of storage between – 4° and – 22° F. (– 20° and – 30° C.). For this purpose the freezing-time may be somewhat lengthened and still give a first-class product, but a freezing-time of two to three hours must not be exceeded. Special plant for rapidity of freezing is quite wasted if storage is to be carried out subsequently at higher temperatures, when other changes occur which soon produce organoleptic effects far worse than those of the slowest freezing. This observation is confirmed by recent histological work, which finds that the large numbers of minute crystals formed inside the cells during rapid freezing grow quickly, during storage in the region of 14° F. (– 10° C.), by coalition into larger masses of ice, which result in deterioration in texture similar to that produced by slow freezing. Moreover, objective tasting tests on fish frozen at different rates by a number of workers in various countries have shown that, as with meat, the rate of freezing can be reduced considerably below the "critical" rate previously defined; freezing-times up to six hours are permissible if the palatability of the end product, particularly as fried fish, is the criterion.

Imported White Fish

However, much of the frozen white fish now being imported is frozen and marketed as fillets in wooden boxes of ½-stone and 1-stone capacity, which have freezing-times of about 12 and 18 hours respectively in still air at – 22° F. (– 30° C.). There is therefore considerable scope for improvement here in the method of freezing, though not without radical alteration of procedure. As long as 1-stone boxes are still regarded as a convenient size of unit, progress can be made by freezing in metal moulds of the size of the box and of half the thickness, preferably either made watertight and immersed in brine, or without lids in moving air at low temperatures, – 22° F. (– 30° C.) at least. Numerous special plants which are now on the market also materially reduce freezing-time to within the limits now recognised as desirable.

Another advantage of accelerated freezing which has nothing to do with the quality of the product obtained is that it may be beneficial for economic reasons to be able to cope with large quantities of fish at an increased rate.

Thawing of Frozen Fish

The general principles of freezing and cold storage outlined above have been established for some time and have received fairly wide recognition. However, with the expansion of the market for frozen fish under present conditions, retailers and others in the trade dealing with the commodity for the first time have experienced some difficulty in thawing it satisfactorily. Lack of observance of a few general considerations may well be deleterious to an otherwise good frozen product. A few observations on this aspect of frozen fish may therefore be timely.

At present the thawing of fish is often carried out by the wholesaler prior to despatch, or by the retailer prior to final sale, although, obviously, fish remain in good condition for a longer time if the advantage of refrigeration is retained for as long as possible after removal from the cold store. In fact, frozen fish is best cooked without going to the inconvenience of thawing at all, thus preventing loss of juices from the interior inevitable in thawing, and preserving the full flavour. Experiments carried out in collaboration with commercial fish friers have demonstrated that frozen whole fish or fillets, when given the customary coating of batter, may be fried in deep fat with no more "sputtering" than occurs with fresh or thawed fish. The rate of thawing has not been found detectably to affect the palatability and texture of the cooked fish.

However, where frozen fish cannot be sold as such, it is obviously desirable to be able to thaw as quickly as possible on wholesale or retail scale in order to cope with sudden demands. On a large scale uniformity of thawing is also a problem.

Thawing Times

Table II gives the actual times required for complete thawing of individual fish and boxes of fish (fresh fillets or smoke-cured fish, including kippers) under various conditions after removal from a low-temperature store at – 4° to – 22° F. (– 20° to – 30° C.). Missing figures or circumstances not dealt with can be arrived at sufficiently accurately by interpolation. The figures, especially for individual fish, are only approximate, since more or less cylindrically shaped fish of the same thickness can vary considerably in weight and, therefore, in the time required for thawing. Flat fish, it will be noted, take about twice as long to thaw as round fish of the same thickness.

It may be seen from Table II that single whole fish are most

TABLE II

THAWING TIMES (IN HOURS) OF FISH SINGLY AND IN BLOCKS

Conditions of Thawing.	*Thickness in Inches.*										*Size of Block.*				
	Round Fish.								*Flat Fish.*		*Half-stone.*		*One-stone.*		
	1¼.	1¾.	2.	2½.	3.	3½.	4½.	5½.	1.	2½.	*In Box.*	*Out of Box.*	*In Box.*	*Out of Box.*	*Flat Blocks.§*
Melting ice	—	30	—	—	—	—	—	—	—	—	—	—	—	—	—
Running water at 40° F. (4·4° C.)	—	1½*	3*	3½*	4*	6*	—	—	2*	5½*	16	12	22	16	—
Running water at 60° F. (15·6° C.)	½	¾	1½	1¾	2	3½	7	14	1	3½	6	3	12	8	2
Air at 40° F. (4·4° C.), still	—	—	36†	40†	44†	52†	—	—	—	—	—	—	—	—	—
Air at 40° F. (4·4° C.), 15′/sec.	—	—	—	—	—	—	—	—	—	—	—	—	44	—	—
Air at 60° F. (15·6° C.), still	2	3	6	8	10	12	19	28	3½	16	14	10	28	20	8
Air at 60° F. (15·6° C.), 3′/sec.	—	—	—	—	9	—	16	—	—	—	12	—	20	—	6½
Air at 60° F. (15·6° C.), 15′/sec.	—	—	—	—	—	—	10	—	—	—	7	—	16	—	5½
Air at 60° F. (15·6° C.), 30′/sec.	Not suitable										6	—	11	—	—
Air at 80° F. (26·7° C.), 3′/sec.											9	3	16‡	11½	—
Air at 80° F. (26·7° C.), 15′/sec.											6	—	13‡	—	3½
Air at 100° F. (37·8° C.), 3′/sec.											5½	3	10‡	8	—
Air at 100° F. (37·8° C.), 15′/sec.											5‡	—	9‡	—	—

* 45° F. (7·2° C.). † 36° F. (2·2° C.). ‡ Noticeable superficial drying in case of white fish fillets.
§ Frozen in metal tin 20 in. × 15 in. × 1¾ in.

rapidly thawed by immersion in running tap-water, preferably at summer temperatures (about 60° F. [15·6° C.]). Care must be taken to remove the fish from the water soon after thawing, in order to avoid detriment to appearance and texture due to "waterlogging". The use of racks to hold the fish is advisable, especially on a large scale, to prevent the fish from sticking together, which by increasing the thickness greatly increases the thawing-time. Under winter conditions it is necessary to heat the water—*e.g.*, by passing steam into it—taking care that the temperature does not much exceed 60° F., otherwise the fish may easily be damaged. Thawing in the open air under ordinary conditions is slow, and warmed moving air is liable to dry the surface of the fish.

Boxes Retard Thawing

A large proportion of the fish now coming into the country is, as previously remarked, in the form of fillets in 1-stone boxes, which are about 3½ ins. deep (5 ins. deep in the case of kippers, which cannot be packed as densely). But just as these boxes give a slowly-frozen product, so also do they greatly retard thawing, as may be seen from Table II.

A small consignment of a few boxes is best dealt with by removing from the boxes and thawing in running tap-water at about 60° F., taking similar precautions to those mentioned above for individual fish. If fillets in the frozen block are stripped apart before they have completely thawed, the tearing at the surface that results spoils the appearance, although marketability as fried fish may not necessarily be impaired.

Smoke-cured fish also could be thawed in water on a retail scale, although both kippers and finnan haddocks require to be laid out singly on a wire tray to dry. Moreover, since smoke-cured fish are less closely packed in boxes than wet fish, water can get into the air spaces and thawing can proceed faster, especially if the block is tapped or the fish pulled apart. They may, in fact, be packed so that they can be separated thus in the frozen state; single kippers can then be thawed in water at 60° F. in about 10 minutes or in about an hour in air at the same temperature. Table II shows that movement of air by means of a fan and preferably warmed to 60° to 80° F. (16° to 27° C.) by means of a heater accelerates the thawing of boxes of fish. The time is further reduced in the case of white fish fillets when the box is removed, but surface drying is noticeable if they are wrapped in the usual way in parchment paper, though not when carefully wrapped in waxed paper.

Durability of Thawed Fish

Fish thawed under all the conditions tabulated are still perfectly edible after a further two days' storage at 36° F. (2° C.). With smoke-cured fish, on the other hand, the higher air temperatures, even 100° F. (38° C.), can safely be used, since the appearance does not deteriorate. Table II shows that 1-stone boxes take about twice as long to thaw as ½-stone boxes. They also lose proportionately about double the weight—about 6½ per cent. (14½ ozs.) compared with 3½ per cent. (4 ozs.) for a ½-stone box. This means that if ½-stone boxes were generally used the "overweight" included in commercial practice of about 1 lb. per stone could be halved. The time required for thawing by whatever method would also be halved, and, in addition, the quality of the fish would be noticeably improved, owing to the faster freezing and smaller losses of juice in thawing.

With the present shortage of wood, however, it is more likely that the solution of rapid thawing is to be sought rather in the alternative methods discussed below. Table II shows that high air speeds, which are almost certainly uneconomic, are necessary if the most rapid thawing is to be obtained under conditions of constant temperature. However, at the low air speed of 3 ft./sec. a satisfactory thawed product is obtained in times of only 5 and 9 hours for ½-stone and 1-stone boxes respectively, if the temperature of the air is maintained at 140° F. (60° C.), while the bulk of the fish is still frozen hard, but is lowered to 70° F. (21° C.) when the outer fillets have passed the thermal arrest. It should thus be possible to thaw boxes of frozen fish much more rapidly than is commonly done, given a thawing chamber designed to give control over temperature and using air flowing at quite a low speed.

For thawing on a retail scale a tunnel of boxes with a fan and heater at one end can be improvised. For thawing larger quantities the problem arises of securing uniformity of flow through a stack of boxes. At Torry Research Station this has been solved, and an apparatus exists capable of thawing about 500 1-stone boxes per day. .

Use of Waxed Paper Speeds up Thawing

Frozen fillets could be thawed more rapidly than is at present possible if the customary methods of packing were altered—for example, by interposing a sheet of waxed paper or three sheets of parchment paper between layers of fillets, when they can

(*Continued on page 65*)

ICE-CREAM MANUFACTURE IN 1941

The general situation of the ice-cream trade is briefly reviewed and some problems confronting the smaller manufacturer are discussed.

L. J. HYNES

SINCE the position of the ice-cream trade of this country was discussed in FOOD MANUFACTURE about the same time last year, things have become still more difficult. Most people expected that they would do so. Ice-cream is composed of substances which are naturally among the first to be rationed when rationing becomes necessary, and as the tendency of Government departments is undoubtedly to regard the product itself as being more or less of a "luxury", which in times of food shortage we must do without, the ice-cream trade is not looked upon with favour when the matter of the allocation of materials has to be considered. There are many who hold the opinion that it has not even been treated fairly as compared with other industries. However this may be, there can be no doubt that it has not been treated generously, and the present position is that manufacturers of all classes are finding it very difficult to carry on.

Prohibition of Milk

The Order prohibiting the use of liquid full-cream milk or skim-milk in ice-cream, which has now been in force some three months or so, has not as yet affected manufacturers very seriously. For one thing, it came at a time when production is always at its lowest, and, for another, many of the larger ice-cream manufacturers, and not a few of the smaller traders, do not normaly use either milk or skim-milk in their mixes, so that an Order forbidding them to do so was no great hardship. Unless, however, the ban on the use of milk and skim-milk is lifted, and that very shortly, its effect will be much more severely felt. The reason is that the position as regards supplies of processed milk—milk powder, both full-cream and skim, and condensed and evaporated milks—has become still more difficult. This being so, many manufacturers of ice-cream who ordinarily would not use milk or skim-milk would now be glad to use either, because of the difficulty of obtaining milk solids in any processed form, so that, unless the ban on the use of liquid milk is lifted before the 1941 season opens, the position will be that every source of milk solids for the ice-cream trade will be either wholly or largely stopped, temporarily at any rate.

The question of the raising of the ban on the use of liquid milk and skim-milk was to be considered by the Ministry of Food some time in February, the Ministry having promised a deputation from the Ice-Cream Association, which it received towards the close of last year, that the position would then be reviewed. Writing before this second meeting, its outcome cannot be guessed, but it can only be hoped that it will be favourable to the industry.

The Milk Powder Position

It is possible that the milk powder position will be somewhat eased before long. It was stated in January that the Ministry of Food had purchased 6,000 tons of milk powder from New Zealand, which country, of course, supplied us with large quantities of dried milk (both full-cream and skim) before the war, and that further consignments might be available from North America. The shipping problem is, however, a serious one, and we have no information that any of this milk powder has yet reached us. Still, there is at least a reasonable hope that it will do so, and that the ice-cream trade will get its fair share of it.

Meanwhile the industry must carry on as best it can—with no milk or skim-milk, with milk powders and other concentrates of milk solids severely rationed and with even the ration unobtainable in many cases, with sugar limited to 40 per cent. of pre-war usage, with almost every sugar substitute either prohibited outright or difficult to obtain, with fats rationed, and with such "fillers" as cornstarch, soya-bean flour and dried egg-yolk in much the same position!

However, it is evident that ice-cream manufacturers, both large and small, are determined to keep the business flag flying, notwithstanding the many difficulties with which they have to contend, and all of them, each in the way which suits him best, are accommodating their mixes and methods to meet the new conditions. It is proposed to review the general situation in some detail, and in doing so it may be that some ideas put forward, particularly to some of the smaller manufacturers faced with peculiar problems, may possibly prove of some value.

Substitute Materials

As substitutes for butterfat, such products as unsalted margarine, the various "100 per cent. fats" (mixtures) and vegetable oils such as palm kernel, cocoanut and groundnut are utilisable, either singly or in suitable combinations. All are rationed, of course, and are purchasable by permit.

The "fillers" which naturally suggest themselves as being useful in replacing some of the milk-solids-not-fat are cornstarch, soya-bean flour and dried egg or egg-yolk. None of these materials, however, is easily obtainable. Potato flour was recently suggested as a possible "filler" by the Ministry of Food. According to Mr. P. Powling, Past-President of the Ice-Cream Association, it was also suggested that the industry might use "oatmeal and even carrots"!

Honey, though expensive, is available as a supplementary sweetening agent, and, with most of the other recognised substitutes for sugar either unobtainable or very limited in supply, will probably be used to an increasing extent. Glucose is not available, saccharin is not too easy to obtain at the moment (and in any case is utilisable only to a very limited extent), and no other solid sweetening substance is readily available. Certain liquid sweeteners derived from saccharin are still to be had. Like saccharin, however, these products convey no solids to the mix, and, therefore, their usefulness is similarly limited on that count alone, apart altogether from any question of possible inferiority in flavour.

Working Out a Mix

In working out a mix formula, the large or considerable manufacturer who usually holds a permit for the purchase of a certain amount of fat, and who, of course, possesses facilities for emulsifying it, will begin with the item which presents least difficulty—the fat. In all probability he will fix this at from 8 to 10 per cent.

Having got so far, he is at once confronted with his great problem—how to balance his fat content with other solids, and which? Irrespective of the amount of milk powder or other concentrate of milk solids (chiefly of the non-fat solids) he may have in stock (and it will probably be relatively small), he is prohibited from producing in any given month a quantity of ice-cream which contains more than half the amount of milk solids (derived from a concentrate) which was contained in the total amount of ice-cream produced in the corresponding month of 1938. Hence he has two alternatives: (1) to cut down production more or less considerably, or (2) to cut down his normal content of milk solids. Of these alternatives he will probably choose the second.

Assuming that he does this, he has now to decide what content of milk-solids-not-fat he can afford in his mix. Normally his mix would almost certainly contain from 10 to 11 per cent. of these solids. Under present conditions he may be able to allow, say, 6 per cent., if as much. Anyhow, let us put it at that figure.

Disregarding for the moment the question of the use of a filler to supplement the milk solids, he next proceeds to deal with the remaining normal constituents of his mix—the sugar, stabiliser and flavouring.

Sweetening the Mix

Ordinarily he would use from 13 to 14 per cent. of sugar—say, 13, as being perhaps the more commonly used proportion. Sugar is now rationed, of course, and no more than 40 per cent. of pre-war usage is allowed. Thus the maximum amount of sugar that can be spared will be about 5·2 per cent. of the mix, unless production is to suffer.. This is obviously inadequate. For reasonable palatability a sweetness equivalent to that produced by about 11 per cent. of sugar is required. However, for the time being the ice-cream manufacturer may put down the figure of 5.2 per cent., leaving the question of what is to be done about it until later.

The matter of the stabiliser fortunately presents no problem. This item can be put down as 0·5 per cent., say, of gelatine. This completes the normal solids, so that the mix thus far reads :

Fat	say, 10·0	per cent.
M.S.N.F.	6·0	,, ,,
Sugar	5·2	,, ,,
Gelatine	0·5	,, ,,
	21·7	per cent.

Normally, the total solids of a mix containing 10 per cent. of fat would be in the immediate neighbourhood of 34 per cent. !

The first question that demands settlement is the matter of sweetness. The mix is short of at least 5·8 per cent. of sugar or its sweetening equivalent.

The Use of Honey

The best available supplementary sweetener is honey. Are there any considerations which might limit the use of this substance? There are four : its relatively high price, its relatively low sweetening power, its effect on flavour, and its effect on the freezing point of a mix. Honey has only about 70 per cent. of the sweetening power of cane or beet sugar, so that, if it were to replace the shortage of 5·8 per cent. of sugar, about 8·3 per cent. would be needed. Honey possesses a characteristic and somewhat variable flavour which, pleasant though it be, may or may not be desired. Its effect on the mix freezing point, since the sugars in it are chiefly glucose and fructose, is like that of invert sugar—it depresses the freezing point nearly twice as much as ordinary sugar.

Assuming for the moment that the economics of manufacture might admit of the use of 8·3 per cent. of honey, would this proportion materially affect the flavour of the ice-cream, in view of the intention to have this of vanilla flavour? A honey content of 8·3 per cent. would produce a mild flavour of honey in the ice-cream—about 9 per cent. is required to give a really definite and distinct honey flavour—and this, though it might be considered unexceptionable in itself, would not blend too well with the flavour of vanilla. Honey flavour is probably the only one which does not blend quite satisfactorily, when fairly pronounced, with that of vanilla.

As far as the effect on the freezing point is concerned, 8·3 per cent. of honey, combined with 5·2 per cent. of sugar, would have an effect roughly equivalent to that of about 21 per cent. of sugar alone. This would bring about conditions to some modified extent comparable to those existing in the case of an ordinary water ice. Temperatures somewhat lower than normal, both for freezing and storage, would be required. This fact would constitute no serious objection, since what is practicable for a water ice should be practicable for ice-cream.

Flavouring Effects

The objection on the score of flavour is more important, though hardly insuperable, particularly in view of the already difficult circumstances. The vanilla item could be kept down so as to avoid too marked a flavour clash. On the whole, it might be desirable to limit the proportion of honey to about 7 per cent. —again assuming, of course, that the use of this amount would be found to be economically practicable. Since 7 per cent. of honey equals about 4·9 per cent. of sugar in sweetening power, we have the equivalent in the mix of 10·1 per cent. (*i.e.*, 5·2 *plus* 4·9), of sugar, this leaving a shortage of 0·9 per cent.

To supply this amount either saccharin, if available, or a liquid sweetener might be used. Since both are very many times stronger than sugar, the proportion required of either would be extremely small, far from sufficient, in all probability, to affect flavour adversely.

The mix now reads :

Fat	10·0	per cent.
M.S.N.F.	6·0	,, ,,
Sugar	5·2	,, ,,
Honey	7·0	,, ,,
Gelatine	0·5	,, ,,
Saccharin (or liquid sweetener)	trace	
	28·7	per cent.

Instead of using saccharin or other substitute, it might be found possible, of course, to increase the sugar to 6·1 per cent. If this could be done, so much the better.

The mix, though now looking better, is still short of solids, and on being frozen to even a moderate overrun would lack body and would tend to be coarse in texture. It needs a filler of some sort.

Fillers

Any suitable starch could be used to the extent of about 1 to 1·25 per cent., with the gelatine reduced, perhaps, to 0·3 or 0·35 per cent. The starch, of course, would require cooking in a portion of the mix at or near its boiling point. From 1 to about 2 per cent. of soya-bean flour, if obtainable, could also be included, or could be replaced by dried whole egg or egg-yolk. Personal preference must determine the amount of these fillers. Starch has a very marked effect on the body of an ice-cream, excessive proportions tending to cause sogginess.

The above mix is a fair sample of what is possible in compounding a formula under the present difficult conditions. Needless to say, the balance (about 70 per cent., according to the precise proportions of fillers used) would be supplied by water ; and if it happened that the M.S.N.F. were provided wholly or partly by a liquid concentrate, like condensed milk, instead of by skim-milk powder or full-cream milk powder (or both) entirely, the water item, of course, would be correspondingly smaller. Full-cream milk powder, if used at all, would be used from necessity, not from choice—because of a shortage of skim-milk powder or other substance providing serum solids only. Obviously so, since it is much more costly than S.M.P.., and, moreover, since the effect of its milk-fat content would be small, would serve the purpose no better.

The Smaller Manufacturers

These may be broadly classified as follows :

(1) Those who are able to obtain supplies of fat and of skim-milk (or whole milk) powder (or other milk-solids concentrate), and who also possess an emulsifying machine.

(2) Those who cannot obtain supplies of fat or have no emulsifier, but who can obtain milk powder or an alternative ingredient.

(3) Those who can obtain neither fat nor any concentrate of milk solids.

Manufacturers coming under category (1) will naturally proceed on much the same lines as the larger producers.

Those under category (2), since they are unable to use a fat as such, can obtain it in the already emulsified form of a synthetic cream. Here is a 1-gallon mix by way of example :

Water	5¾ pts.
Synthetic cream	1½ pts.
S.M.P.	5½ oz.
Sugar	1 lb.
Honey	6 oz.
Starch	2–2½ oz.
Gelatine	¾–1 oz.
Flavouring.	

If circumstances allowed the use of 1¼ lbs. instead of only 1 lb. of sugar, the honey could be eliminated or reduced, as preferred.

The small traders coming under category (3) are unfortunate. Evidently the best they can do is to make a simple water ice or, alternatively, a slightly richer product of an essentially similar sort—a kind of sherbet, a water ice which, in this case, will contain some synthetic cream.

It is suggested that the water ice might be constituted somewhat as follows :

Sugar	1¼–1½ lb.
Honey	14–16 oz.
Gelatine	1½ oz.
Acid (citric or tartaric)	¾ oz. (approx.)
Water	6–6¼ pts.
Fruit flavouring (*e.g.*., essence).	
Colouring as required.	

The probable maximum of sugar available has been given in the above mix. Even so, the latter will lack sweetness. A little saccharin or liquid sweetener might be used to supplement it.

Those small manufacturers who are fortunate enough to be able to obtain supplies of one of the various cold-process ice-cream powders—they will obviously come under category (1) or (2) above, and will have been pre-war users of these lines, which the makers have usually to ration to customers already on their books—will naturally accommodate themselves to circumstances, using a suitable fat and emulsifying it themselves, or purchasing synthetic cream and obtaining fat in this way, or, in the case of "cold-water" powders, using these as they stand, without modification.

LETTERS TO THE EDITOR

ESTIMATION OF VITAMIN B_1

The Editor.

DEAR SIR,

In researches which I have been conducting on the quantitative estimation of vitamin B_1, I have found, until recently, various factors that precluded the possibility of accurate and reproducible measurements.

For simple estimations of the natural product, I have previously evolved a new technique for the production of a stable di-azotised aniline-*p*-sulphonic acid as used in the colorimetric method.

The Thiochrome method, however, is capable of reacting to both natural and synthetic vitamin B_1, but its measurement by the comparison of the two fluorescing solutions presents many difficulties. The eye is not easily adapted to perform this subjective test, as the emitted wavelength is by no means near the peak of eye sensitivity. The Fluorometer can, unless in skilled hands, give misleading results, while wavelength difference between the control and sample cannot be entirely overcome by filters.

A simple U.V. titration would seem to be the best solution to the problem, and the writer has now succeeded in developing such a method.

The new method consists in titrating the iso-butyl alcohol extract with the following solutions:

A.

Selenium oxychloride	5 per cent.
Iso-butyl alcohol	95 ,, ,,

B.

Bromine	1·5 per cent.
Iso-butyl alcohol	98·5 ,, ,,

The solutions A and B are mixed in equal proportions and the operation conducted under the U.V. lamp. The end point is indicated by the extinction of fluorescence. The preparation of the control tube is now rendered unnecessary, as the solution can be standardised with a known vitamin B_1 concentration.

It is advisable to keep the solutions separate, but sufficient can be mixed for a day's requirements. The percentage composition of A and B may be varied if required, but, of course, must be standardised.

Yours faithfully,
C. G. LEMON, F.PH.S.

Electro-Physical Research Laboratory,
Kensington, W. 8.

VITAMIN B_1 IN BREAD

The Editor.

DEAR SIR,

I am sorry that Mr. Bacharach did not take my phrase "minimum daily intake required" as implying "for normal health". This should have been obvious since I took as the standard one which Mr. Bacharach used—namely, 500 units. If he has a feeling that this standard is too low then his case for more vitamin B_1 in bread can be admitted, but until the standard which has been advancing steadily is really fixed there is no basis on which to work.

The case against excessive additions to white flour is of course mainly economic, but the point which I brought out in my last paragraph but one seems to me of greatest importance. The people with low incomes will eat the most bread and potatoes, now two quite good sources of B_1. Where the more expensive sources are available the consumption of bread and potatoes will fall, and so all sections of the community should obtain a good intake.

Yours faithfully,
H. HORACE WARD.

Aynsome Laboratories,
Grange-over-Sands.

(*This correspondence is now closed.*—EDITOR.)

LABELS FROM STRAW

The Editor.

DEAR SIR,

In the January number of FOOD MANUFACTURE you have printed a particularly interesting article written by Mr. R. L. Kenny, B.Sc., F.I.C., dealing with the progress of the Confectionery Industry during 1940.

In the paragraph headed "Packaging and Design", Mr. Kenny points out that a new Order recently introduced concerning the labelling of packages has restricted the size of the label on any new pack to a maximum of 20 square inches. This is, of course, incorrect, as Order No. 28 issued on November 2 brought full-size labels back into use again, providing the material used is made from straw.

In many directions this may conjure up an inferior paper, but, in actual practice, this new material is proving very satisfactory. The enclosed specimens, which have been produced on this straw paper, show that a really high standard of craftsmanship is possible. What is more, the paper has proved trouble-free on automatic labelling machines.

We are, in fact, printing this material in sheets as large as 40 ins. by 60 ins., and we feel that the splendid efforts of the Paper Industry in this country in overcoming their difficulties in this manner should receive due acknowledgment in the Trade Press.

Yours faithfully,
LESLIE BROWN,
Sales Manager,
Brown and Radcliffe, Ltd.

(We examined the labels sent with the above letter and we were impressed by their high quality and good appearance.—ED.)

CRITICISM

The Editor.

DEAR SIR,

I thank you for the regular postal delivery of FOOD MANUFACTURE, and, although a little late, tender my best wishes for the coming year.

I have so often found that criticism and, alas! at times complaint, is rather apt to be more instructive and useful than mere idle praise, and in writing to you I trust that I may be forgiven.

Of recent months FOOD MANUFACTURE has rather tended to become a Journal for the "Works and Research Chemist", and a good deal of your now valuable space is devoted to various articles of research, of vitamins and on matters actually of little interest to men engaged in actual manufacture of foodstuffs.

I quite agree that any journal should maintain its tone towards the "uplift" of the industry generally, but many of our American friends who contribute data might be surprised to learn that by far the majority of foodstuff manufacturers in this country do not use *vacuum pans* and that 95 per cent. of the varied trades concerned do not employ a "works chemist."

Rather is it the so-called works manager who carries that responsibility, and he is often a person with lifelong experience in his particular branch of food manufacture—a man who judges the temperature of his boil by the mere appearance of the sugar, etc., in his pan.

These men do not delve into a book at every snag, but search their own minds and recall past experiences—real "backbones" of the industry—and yet so many have not the least idea of *p*H valuations or of balanced vitamins and proteins!

I think we might have more articles dealing with helpful hints—alternatives that might be used or combined where normal products are not now to be obtained, general assistance for the small as well as the large manufacturing concerns that might be of great value in the many difficulties that confront the food industry in war-time.

Just as there is a heavy boundary between theory and actual works practice, so also is there a boundary between those foods which the *chemist* says are "so very good for us" and the excellent seller which is very *palatable*.

(*Continued on page 64*)

PROGRESS IN 1940.

FRUIT AND VEGETABLE CANNING

Many of the developments of the fruit and vegetable canning industry have been in the direction of adaptations to war-time conditions, although nutritional research, equally important in peace and war, has been actively carried on.

J. G. HUNTLEY, B.A.

DEVELOPMENTS of and investigations into the technique of fruit and vegetable canning which have taken place during the past year throughout the world have been influenced by two very different motives—the adaptation of the industry to war conditions and the more normal incentives to research of peace-time. Some branches of enquiry, such as the nutritional, are, of course, equally important both in war and peace.

Wartime Economies

In connection with the canning of fruit many problems have arisen owing to the changed circumstances produced by the war. It early became apparent to the fruit canners that difficulty would be experienced in obtaining their normal requirements of sugar, and, in order that the maximum amount of fruit might be packed with the sugar which was available, an Order[1] was made by the Minister of Food which specified that a 30° Brix syrup should be used for all fruits except apples, unless packed in A.10 cans. Any fruit in A.10 cans or apples in any size of can may be packed in 15° Brix syrup or water, if suitably labelled.

A further economy which the canning industry had to effect was in the tinplate used in the manufacture of cans. There are two ways in which the amount of tinplate used may be reduced: firstly, by increasing the weight of fruit per can, and, secondly, by using as large a can as possible and of such a shape as to have the greatest possible ratio of volume to tinplate area. It can be shown by calculation that for any given capacity the cylindrical can with the highest ratio of capacity to area of tinplate is one in which the height is about 1·5 times the diameter, and that the ratio of capacity to tinplate area increases with the total volume of the can. It was apparent, therefore, that if the best use was to be made of the tinplate which was available it would be necessary to do away with very small cans and to permit the use only of those of any given necessary capacity which had a height diameter ratio most nearly approaching 1·5. These considerations were put into effect by the same Order as that specifying the syrup strength, which gave a minimum filling weight for all fruits and vegetables in various sizes of can, and by a further Order[2] issued by the Minister of Supply, in which the sizes of cans which might be used for packing fruits and vegetables were restricted.

Substitutes for Sugar

The problem of maintaining the volume of the fruit pack in spite of the difficulty of sugar supplies was also attacked by the use of sugar substitutes, the best known of which is saccharin. Various other sweetening agents, some of them incorporating saccharin, are on the market, but it has been shown that saccharin cannot be considered as a substitute for sugar in canned fruit, although it may be quite suitable for use in canned vegetables and other non-acid food products.

A record of a considerable amount of work has been published in the last year in American journals on the use of dextrose in fruit canning, and, although this is not of use in meeting the present sugar position in England, the claims made for it are of great interest to the fruit canner. Eichelberg[3] states that the improved flavour of fruits and vegetables packed with dextrose-sucrose blends indicates a possible means of maintaining the taste and palatability over a longer period of time. The factors chiefly affecting the optimum amount of dextrose are the *p*H, the processing conditions, and the other ingredients of the syrup or brine.

The Stability of Vitamins in Canned Fruits and Vegetables

Both in this country and in the U.S.A. considerable research has been carried out on the nutritional values of canned fruits and vegetables. In a recent publication, Olliver[4] has described the effect on vitamin C of canning and of household cooking, and has shown that its stability is greater than was at first thought. The antiscorbutic values of fruits and vegetables as prepared for the table are very similar, whether they are canned or carefully cooked by household methods. It was also shown that the addition of sodium carbonate to vegetables, as is sometimes done in the home, does not have the destructive effect on vitamin C which was supposed. The greatest loss of the vitamin is occasioned by extraction by the water used for blanching or cooking, and for this reason canned products are likely to have a higher vitamin content because the proportion of liquid to vegetable in the can is relatively less than that used in domestic cooking. There is little loss of the vitamin during the processing of the filled can, since most of the air has been extracted and the can is sealed. Canning also has the advantage over domestic preparation that the raw material is freshly picked, whereas that supplied to the housewife is very often several days old and will have lost a proportion of its original vitamin C content.[5]

Of particular value at the present time, when supplies of imported fruits may be limited, is the knowledge of the high antiscorbutic value of some British-grown fruits and vegetables. The black currant is outstanding in this respect, and the fruit or its juice, whether fresh or canned, provides a source of vitamin C superior to orange juice, which has been in such popular demand in recent years for use in infant nutrition.

In America, Fellers, Esselen and Fitzgerald[6] have recently investigated the influence of quick freezing and canning on the vitamin B_1 and B_2 content of vegetables, and compared it with that of the raw vegetables. They give the following figures for the percentage retention of the vitamin when the products are canned or quick frozen:

PER CENT. OF VITAMINS B_1 AND $B_2(G)$ RETAINED DURING CANNING OR QUICK FREEZING

	Canned.		*Quick Frozen.*	
	B_1 *Per Cent.*	$B_2(G)$ *Per Cent.*	B_1 *Per. Cent.*	$B_2(G)$ *Per Cent.*
Asparagus ...	72	98	78	95
Peas	60	100	97	100
Lima beans ...	28	70	46	84
Spinach	71	45	94	91

Here again, as with vitamin C, minimum blanching periods are recommended in order to decrease the extraction of the water-soluble vitamins.

It should be noted that cooking of frozen vegetables for the table requires the use of a further quantity of water, involving a loss of vitamin not taken into account in the table.

Developments in Can Making

To the fruit and vegetable canner 1940 brought many problems connected with the container itself. Cans lacquered internally after fabrication are almost perfectly covered with lacquer. Such cans were available in 1939 for fruit packing, but it was not possible to obtain them during the 1940 fruit season. The marked improvement in the quality and the storage life of fruits so canned has now been effectively demonstrated, and there is little doubt that, as soon as conditions permit, post-fabrication lacquered cans will be exclusively used for those fruits which cannot be packed in plain cans and perhaps for all fruits.

American experience[11] during 1940 has again confirmed that of previous years in demonstrating the value of cold-reduced tinplate in decreasing hydrogen formation in cans containing acid products. The use of this tinplate, together with complete coverage of the interior of the can with lacquer, offer the best hope for a solution of the hydrogen swell problem, which has for so long been the bugbear of fruit canners. During this year much progress has been made in the development of the British manufacture of phenolic resin lacquers for cans, and lacquers of this type have proved themselves experimentally at least to be

eminently suitable for use on containers for a wide range of acid and non-acid products.

In Germany[12] both before and during the war much attention has been paid to production of cans from blackplate—*i.e.*, steel-plate with no tin-coating. Such cans are protected from attack by their contents by a coating of internal lacquer, and are externally lacquered to prevent outside rusting. They have been found to be reasonably satisfactory, but great difficulty has been encountered during manufacture in the formation of a hermetic joint at the side seam strong enough to withstand the internal pressures developed during processing. This problem has, it is stated, been solved in Germany by the use of spot welding, but if soldering is to be employed it is necessary to tin that part of the blackplate forming the side seam. The use of such cans is, however, of more interest to the Germans than ourselves, since the problem of the British can manufacturer is not so much one of economising in the use of tin as of making the most efficient use of the steel which is available. Obviously the blackplate can does not affect the situation in this respect.

Pressure Cooling

Since vegetables have perforce, from bacteriological considerations, to be processed under pressure, the forces which the can is called upon to withstand are considerably greater than those which are met with in fruit canning, and the treatment of the cans during the process has to be conducted with a full knowledge of the conditions of pressure to which the can is subjected. An investigation of these pressures has recently been carried out by the British Food Manufacturers Research Association, and further work is being done in other laboratories.[7] The effect of this work has been to show that the maximum pressures likely to be experienced are considerable, and that these occur at the moment of the release of the retort pressure. A recommendation that pressure cooling should be used is made. Calculations made some time ago and reviewed during the year show that the pressures developed in many cans may distort the ends to an extent sufficient to cause failure of the seams and to give rise to considerable spoilage.

The Quality of Canned Vegetables

In the United States a patent[8] has recently been granted for a method of preservation of the natural green colour of vegetables during canning. This aims at the prevention of the loss or destruction of pigment-magnesium by the maintenance of a slightly alkaline condition within the vegetable tissue throughout the canning operation. The natural texture of the vegetable is also maintained by the use of suitable alkaline solutions. While the process has been demonstrated to be effective in preserving the green colour of fresh peas when canned, it is doubtful if it is of as much value in England as in the United States because of the general practice in this country of adding colour to green vegetables.

An instrument which is now being produced on a commercial basis in America is the tenderometer,[9] which is used for assessing the texture of raw peas. Essentially the instrument measures the force required to drive a number of metallic rods or bars through a mass of the peas whose texture is to be determined, and by empirical calibration[10] it has been found possible to get an indication as to the quality of the canned product which will result from any given lot of fresh peas. It is possible that it might be equally well applied to the assessment of the quality of other of the canner's raw materials.

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7. T. W. Jones, *Proc. Chem. Eng. Group*, 1940, 22. (Discussion.)
8. U.S. Patent No. 2,187,774, February 13, 1940.
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Letters to the Editor

(*Continued from page 62*)

During recent years much has been done to improve vitamin content, but so often has this been achieved at the partial expense of the palatability of the foodstuff in question.

This sort of thing gets us nowhere and is rather akin to the article in your January issue on "Thiourea as a Fruit Preservative."

Maybe small discoveries lead to bigger things, but the fact remains that thiocarbamide is definitely *toxic*.

The excuse put forward is that because no person is at all likely to eat sufficient apples to cause illness with treated fruit it will be quite safe to *recommend* this thiourea treatment.

Certainly not; I wish we could do so. My own connections in the food colouring business are bound up with the toxicity of dyestuffs.

Often we have discovered a most excellent colour, but the *suspicion* of a toxic reaction at once bars the colour from being used.

I venture to say that more persons will subscribe to Food Manufacture if there is more, shall I say, real *working interest* than there will be if much of the journal is given over to the scientific side.

Kindest regards.

Yours faithfully,
E. R. Leadbetter.
(*L. J. Pointing and Son, Hexham-on-Tyne.*)

FOOD PREPARATION (MISCELLANEOUS) EXPORT GROUP

The Secretary of the above Group has passed to Food Manufacture the following letter, received from New Zealand:

Dear Sir,

If you have some means of communicating to your members our wish to enter into correspondence with them relative to the sale of their goods in this country, we think this might bring some results.

As a result of the Import Control Regulations (1938), quite a number of firms who at one time enjoyed a first-class importing business have been forced to close down. It is for this reason that we suggested that some of your members might wish to contact with firms still in business and with an organisation such as ours. We therefore respectfully suggest that you circularise the members of your Group, giving them the necessary information regarding our operations in New Zealand.

Due to the publicity which was given by English Ministers of the Crown, and also leading industrialists, that English manufacturers were most anxious to extend their export business, many genuine efforts have been made in this country to increase imports from the Mother Country. With the formation of the various Export Groups in England, it was felt by importers here that good results would be forthcoming, both for the English manufacturer and the New Zealand importer.

However, a statement made by Captain Oliver Lyttelton, President of the Board of Trade, London, that restrictions are to be imposed on inter-Empire trade, has come somewhat of a surprise to a large section of the business community of New Zealand. Mention was made that the Dominions could greatly contribute to the joint war effort if restrictions on civilian consumption were imposed, similar to those in the United Kingdom.

As far as restrictions on civilian consumption are concerned, the action of our Labour Government in imposing the Import Control Regulations which came into force in December, 1938, has resulted in a considerable contraction in the importation of manufactured goods.

We would be greatly interested to hear the view of your Group on the statement made by Captain Oliver Lyttelton.

We have read with considerable concern about the vicious air attacks made by the Nazis on Coventry and Birmingham. We marvel at the courage and patience displayed by our English cousins throughout the continued bombardment of London and other important centres of the Mother Country. Please be assured that our thoughts and sympathies are with you in your present ordeal.

Yours faithfully,
(*pp.* Spedding, Ltd.)
W. A. Boucher,
Managing Director.

CANADA'S QUICK-FREEZING INDUSTRY

CANADA'S new quick-freezing industry, in making possible more efficient distribution of Dominion-produced perishable foods, contributes in no small measure to the war economy this year by conserving foreign exchange and, at the same time, aiding agriculture and developing opportunities for export trade, Edwin T. Gibson, Vice-President of the General Foods Corporation in charge of the frosted foods division, stated recently.

He was speaking at a luncheon given in his honour at the Mount Royal Hotel by the Hudson's Bay Company. The luncheon marked the completion of the introduction of Birds Eye Frosted Foods to leading Canadian trading areas by the Hudson's Bay Company, and was attended by university authorities on agriculture and nutrition, women's club officials, dietitians, publishers, food writers, medical authorities and food distributors. Exhibits were shown of Birds Eye Frosted Foods, all of which are produced and packed in Canada by Canadian labour and marketed by the Hudson's Bay Company.

Mr. Gibson reviewed the accomplishment in 1940 of Birds Eye quick-freezing operations established at Canadian fisheries and near Canadian fruit- and vegetable-raising centres. He told how quick-freezing makes Canadian-produced fruits, vegetables, and sea foods, with a full quota of vitamins, minerals and nutriment, available throughout the Dominion at all seasons of the year at budget prices.

"Because vitamin content and nutritional values in Birds Eye foods compare favourably with the freshest foods available in any market, the general availability of these quick-frozen foods throughout the Dominion offers an assurance of health protection in time of national stress," Mr. Gibson pointed out.

"In addition to providing more efficient methods of distributing fresh fruits, vegetables and sea food produced in Canada, the scientific research undertaken on behalf of Birds Eye products has already had an important effect on the improvement of varieties of fruits and vegetables. Peas are a good example of the far-reaching effect of Clarence Birdseye's invention on the continent's diet.

"From the time the seeds of the peas are selected right up to the minute the peas are purchased at some retail store they are under the control and supervision of experienced scientists. It required testing of 105 varieties before two types of peas were discovered which were in all respects satisfactory.. To-day each Birds Eye quick-frozen product has required similar exhaustive experimentation to guarantee its present quality. All Birds Eye vegetables and fruits sold in Canada are produced by Canadian agriculture; the Birds Eye sea foods come from Canada's territorial waters and are packed in Canada.

"The expansion of the quick-freezing industry has also had far-reaching effects on transportation. During the last decade new packaging materials and machinery, as well as low-temperature refrigerator cars, cases and trucks, have been developed to preserve the pristine freshness of quick-frozen foods. Adequate warehousing and transportation facilities are now available for handling increased shipments of quick-frozen foods.

"Because quick-frozen foods are cleaned, freed of waste material, graded, packed and quick-frozen within a few hours of the time they are harvested, they provide important economies in transportation and warehousing—factors which become especially important when these facilities are strained by national defence needs. Food preparation time is cut in half because all of these quick-frozen foods come ready to cook and serve. There is no waste. Canadian home-makers and institutional chefs now can plan menus without seasonal or geographical limitations."

MINISTRY OF FOOD

Cocoa Prices

THE Ministry of Food announces that from March 1, 1941, the selling price of Gold Coast and Nigerian Raw Cocoa Beans will be raised by 10s. per cwt.—*i.e.*, from a basis of 35s. to 45s. per cwt. for Gold Coast good fermented. The necessary Amendment to the Raw Cocoa (West African) (Maximum Prices) Order, 1940, will be made in due course.

It has also been decided to introduce immediately a further degree of control over all imports of raw cocoa beans from destinations other than the Gold Coast and Nigeria, for the purpose of imposing on all such cocoa a levy of 10s. per cwt. for ordinary grades and 15s. per cwt. for fine grades. Detailed procedure is being discussed with the trade. The proceeds of this levy will be retained by the Ministry of Food.

Supplies of Manufacturing Meat

Owing to the limited supplies of manufacturing meat, which is mainly imported, it has recently been necessary for the Ministry of Food to revise the qualifications under which general butchers may be classified as Group I manufacturers for the purpose of receiving allocations of this meat. As a result general butchers are no longer eligible for classification as Group I manufacturers unless they had in 1938 a weekly usage of meat for manufacture of not less than one ton. These revised arrangements, which were generally approved by the Ministry's Consultative Conference for the Retail Meat Trade, have enabled the Ministry to divert manufacturing meat to pork butchers in lieu of pork, which, since the inclusion of pork in the ration, may be sold only by general butchers.

Supplies of manufacturing meat are now being distributed to about 900 Group I meat manufacturers throughout the country and to about 3,000 pork butchers. All general butchers who do not receive allocations of meat for manufacturing of Group I manufacturers receive an allocation of carcase meat for this purpose on the basis of their buying permits.

New Appointments

Sir James Curtis, K.B.E., D.L., J.P., has been appointed by the Minister of Food as Adviser (unpaid) to the Ministry on Divisional and Local Organisation, and will relinquish on January 31, 1941, his post as Divisional Food Officer, Midland Division, in which he has served without remuneration.

The Minister wishes to place on record his warm appreciation of the active and prominent part which Sir James Curtis has played for a number of years, not only within the Midland Division, but also in the whole range of the Ministry's national activities.

The Minister has appointed Major A. H. S. Waters, V.C., D.S.O., M.C., J.P., Deputy-Divisional Food Officer, Midland Division, to be Divisional Food Officer in that Division as from February 1. At his own request Major Waters will continue to serve the Ministry without remuneration.

Frozen Fish and its Problems

(*Continued from page 59*)

easily be separated in the frozen state and thawed individually, fillets 1½ ins. thick and 2 lb. in weight taking in water at 60° F. about half an hour and in air at 60° F. about four hours. The use of paper between the fish, which makes practically no difference to the rate of freezing, would make it possible to send boxes of fillets to the retailer, *restaurateur* or fish frier in the frozen condition, the separate fillets being thawed quite rapidly on arrival or cooked whilst still frozen.

If the 1-stone box which so considerably retards heat transfer in both freezing and thawing were abandoned, a package could be employed in which the thickness and insulation of the package were reduced. Thus fish frozen in metal moulds of the size and shape of the present 1-stone and ½-stone boxes and stored in blocks have shorter thawing-times, as given in Table II.

The times for blocks of fish frozen in flatter tins holding about 1 stone are also given for comparison. This method, in addition to giving rapid freezing, also permits of thawing within a few hours. These frozen blocks of fish might well be distributed to retailers in large wooden storage boxes, and this method of packing effects economy in wood and in storage space.

Freezing in Waxed Cartons

Fish is increasingly being frozen in small waxed cartons of fairly low heat insulation by firms using some of the more modern plants designed for rapid freezing. One pound of fillets can be put up in such a package having dimensions of about 6 ins. by 4 ins. by 1¼ ins., which in air at 60° F. thaws in about 3 hours.

FOOD MANUFACTURE INDEX FOR 1940

THE 1940 index of FOOD MANUFACTURE is now ready, and copies will be available to subscribers on receipt of a stamped addressed envelope. This envelope should be 10 inches by 8 inches to avoid undue folding of the Index.

NEWS FROM THE INDUSTRY

Cold Drinks

The amazing difficulty in obtaining a really cold drink is a curious feature of this country in warm weather. "Iced drinks" are often a delusion and a sham and characterised mainly by their tepidity and insipidity. This makes the new Phyzzi-Kool Drink Dispenser an attractive item for caterers, works canteens, milk bars, *cafés*, restaurants and other places where drinks are served.

This machine makes aerated drinks automatically, and is non-mechanical in operation. It consists of a stainless steel chamber which contains the drink, fitted with an agitator through which CO_2 enters. Fitted also in this chamber is the draw-off pipe with an exterior tap, from which the drink is dispensed. Below is a dry-ice chamber in contact with the container.

The main draw-off tap is used until the liquid is exhausted, except for one gallon for emergency. The replacement of liquid is made through the lid, which is rapidly opened by a turn of the handle. Once refilled, and the lid replaced, a cold aerated drink is obtained in the matter of a minute or two—thus the machine gives almost continuous delivery. Only one charge of dry ice is necessary each day for repeated fillings.

The automatic agitation evenly distributes fruit particles in squashes and thoroughly mixes other drinks, preventing also the clogging of measures.

The Phyzzi-Kool is made in $2\frac{1}{2}$ and 5 gallon sizes by Dorset Industries (Poole), Ltd., and a demonstration of the machine at work may be arranged.

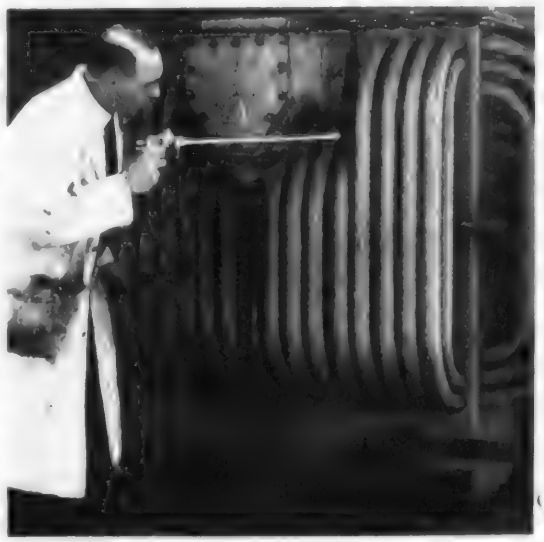
Extension Guns Solve Spray Painting Problems

Both in the maintenance of factories and in the finishing of many types of packages and containers spray painting plays an important part. With the general speeding up of industry its use is being greatly extended and fresh problems are constantly being presented to the manufacturers of spray painting equipment. Many of these concern spray painting in inaccessible and out-of-reach positions, and to meet such difficulties B.E.N. Patents, Ltd., have developed a range of Extension Guns designed to provide an effective solution to the majority of such problems.

For spraying surfaces which cannot otherwise be reached except by ladders and scaffolding there is the Model "LR" Long Reach Gun. This can be supplied in 3 ft., 5 ft., and 6 ft. 6 ins. lengths and the weight of the longest is only 4 lbs. It is, moreover, very carefully balanced, and this together with the fact that both the air control and material supply are controlled by a single hand-grip lever makes it exceptionally easy to operate. For factory maintenance or camouflage work this is an exceedingly useful piece of equipment.

Designed to reach inaccessible places such as pipework on electrical transformers and tubular boilers, the Model G.E. is a particularly handy gun. The standard extensions are 12 ins. and 18 ins. respectively, but special extensions can be supplied.

The third model in the B.E.N. range of extension guns is the Model G.I., designed for the internal spraying of pipes, tubes and similar products. This is being widely used for spraying the interior of shell cases and its application to the finishing of many types of containers will be obvious. It produces a completely circular spray which is under constant control and which can be varied in diameter from 2 ins. upwards. Available in different lengths and with various spray head assemblies, it can be supplied to meet the special requirements of the job it is called upon to perform. Those who would like further details of these spray guns should write to B.E.N. Patents, Ltd., for leaflet C.B. 57.



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Valves for Foodstuffs and Chemicals

Those handling liquids or semi-solids in the foodstuffs industry will be glad to have particulars of the Saunders Glass-lined Diaphragm Valve, on the hygienic properties of which the makers lay special stress for the following reasons: First, the fluid comes in contact only with the vitreous lining of the valve and the special white rubber of the diaphragm. Furthermore, there are no pockets to trap fluid which may give rise to fermentation or bacterial infection. Instead, when the valve is open there is "streamline" flow right through, and the dismantling of the valve for cleansing is an operation taking only a few seconds. When the valve is closed the rubber diaphragm beds down on the glass-lined seat or weir in such a way that even though the fluid may contain solid particles in suspension there can be no leakage. Again, though the valve action is permanently lubricated, there is not the slightest possibility of the lubricant contaminating the fluid handled. The diaphragm, in fact, acts as a seal, completely isolating the working parts of the valve from the fluid in the pipeline.

Such valves have already important users in the foodstuffs industry, and should readily find more. They are fully described in the Handbook of the Saunders Valve Co., Ltd., who will be glad to send copies to interested manufacturers.

* * *

Steam Jacketed Pan Efficiency

Much has been written about the operation of steam jacketed pans, but until recently little attempt has been made to provide, in a single treatise, vital information concerning certain features of pan operation which depend upon methods of draining and air venting.

In these circumstances, readers will welcome the news that one of our leading manufacturers of steam traps, pipeline strainers and air vents, Spirax Manufacturing Co., Ltd., has published an entirely new technical handbook which in all probability is the most up-to-date and complete work available on the subject of draining condensate and venting air from steam jacketed pans, and which represents a valuable guide to successful pan operation.

We understand that the book is supplied without charge, but in view of paper restrictions it is reserved for requests, and readers should write for a copy of this important addition to technical literature on steam jacketed pans.

"Fulscope" Controllers

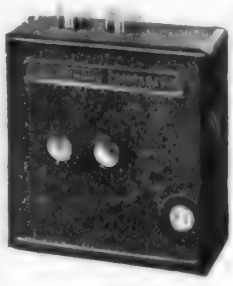
The catalogue of instruments issued by Short and Mason, Ltd., contains a very full range of different Controllers. The "Fulscope" Controllers for temperature, pressure, humidity, rate of flow and liquid level are some of the available forms, and the versatility and accuracy of the instruments have been well proven in actual practice.

It would need pages to describe the variety of instruments of direct application to the food and other industries. Recording Thermometers, Electric Contact Controllers for temperature or pressure, Hot and Cold Water Mixers, Recording Pressure Gauges, Dial Thermometers, Industrial Type Mercury-in-Glass Thermometers, Hygrometers, Airmeters and Anemometers are merely a few of the items described in the booklet.

* * *

Optical Analysis

The saving of time in routine checking of products and processes is much to be desired in these days. The Lovibond Comparator, illustrated here, well satisfies this requirement. This well-known pocket instrument with interchangeable colour standards is now available for nearly 100 tests, many of which have been added recently. Among the new discs may be mentioned quantitative tests for aluminium, phosphate in boiler water, silica, and the resazurin milk test. The already established discs include a wide range of pH indicators, iron, copper, chlorine and oxygen.



The B.D.H. Lovibond Nessleriser is designed on the same principle, but is able to record micro amounts of the radicle sought, owing to the greater depth of tube involved. Among available discs likely to be of interest to the food trade are those for lead, cobalt, nitrate and nitrite.

The Tintometer, Ltd., makers of these instruments, have made tremendous strides in their optical glass cell department, and are now manufacturing all types of cells, colorimeter cups, etc., with welded joints and optical faces.

* * *

Apple Peeling and Coring Machine

Of interest to fruit canners is a recently improved apple peeling and coring machine.

This machine is ready for use at any electric light socket. It has a three-fork action—*i.e.*, three apples are in process of peeling at the same time and 28 to 30 apples are pared and cored per minute. It is supplied either for belt or motor drive, the makers being William Brierley, Collier and Hartley, Ltd.

Temperature and Pressure Control

The illustration shows a Model 90 Controller of Bristol's Instrument Company, Ltd., designed to take care of the many requirements for automatic temperature and pressure control that do not warrant a chart record, and also for applications where recording instruments are already in use.

The outstanding feature of this controller is that it is equipped with a precision-measuring element of the same type as that used in the Free-Vane Controller. The measuring element used is of the same type as those employed in Bristol's Recording Instruments, where accuracy is of prime importance.

The Free-Vane Pneumatic-Type Temperature Controllers, mentioned above, are for temperatures of minus 60° F. to plus 1,000° F. These employ the well-known system of pneumatic control, coupled with the type of temperature-measuring system used in Bristol's Recording Thermometers. The principle provides the means of accomplishing automatic control by regulating the action of a diaphragm valve in the fuel line, steam line or cooling-medium line.

The outstanding feature of the Free-Vane system of control is that it requires practically no power from the measuring system to operate the control apparatus.

* * *

Thermostats

Mr. W. Stanley Crosier, Technical Director of Sarco Thermostats, Ltd., informs us that they have transferred their Head Office to their works at Cheltenham, Glos. (Spirax Manufacturing Co., Ltd.). The latter are makers, of course, also of the well-known Spirax Steam Traps, and are an associated Company of Sarco Thermostats, Ltd.

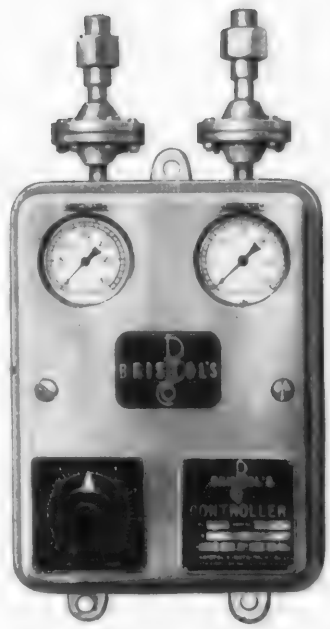
Mr. Crosier will direct sales distribution and the Sarco Technical Advisory Department from 130-132, St. George's Road, Cheltenham, Glos., to which address all enquiries should be addressed.

A new illustrated catalogue dealing with the well-known Sarco Three-way Blenders and Thermostatic Mixing Valves has recently been published. Some very interesting applications of Sarco Blenders in food manufacture are discussed and illustrated. Those interested in the "self-acting" or "non-electric" principle in thermostatic control, in which, of course, Sarco Thermostats are pioneers, should send for copies of this catalogue.

* * *

Retort Recorders

A recent production of Negretti and Zambra is a recorder which, while primarily produced for the measurement of high temperatures, has been used in connection with penetration temperatures in the processing of canned foods. A special type of thermocouple is inserted in the container and brought out through a pressure-tight gland in the cooker to the recorder. Records show the heat penetration, and this provides a means of arriving at the cooking time for packs. (See illustration on right.)

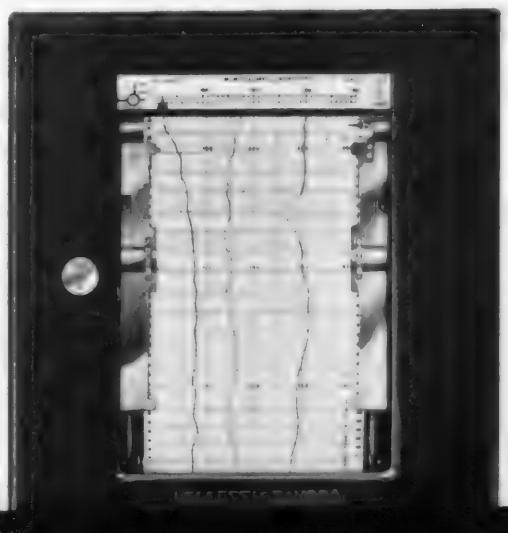


Temperature Recorders

The Drayton Temperature Recorders, made by the Drayton Regulator and Instrument Company, Ltd., are robust in construction and accurate in operation. Transmission linkage is eliminated or reduced to a minimum by a directly operated helical bourdon movement. The standard instrument is fitted with a 24-hour clock and 10 in. chart.

The three types made are all used in canning processes. The V.T. Regulator is a self-operated regulator which is economical to use as it dispenses with any external source of power. Its differential is −3° F. The A.M. Regulator is a relay regulator operating a diaphragm valve by means of compressed air or water. It is used where the differential is too low or the size of the valve too large or the pressure too high for a V.T. Finally, the Dial Set Regulator is used where close control is required under difficult conditions. It is of the transmitting type, is extremely sensitive and requires compressed air for its operation.

* * *



Cold Storage at Milk Marketing Board

In connection with the canteen at the Milk Marketing Board's premises, refrigeration equipment and cold rooms were supplied by Coldair, Ltd. (an associate company of the General Electric Company, Ltd.). The facilities these provide greatly assist in providing a satisfactory menu under war-time conditions. There are two cold rooms: one of 119 cu. ft. capacity used for storing meat, etc., at a temperature of 36° to 38° F., and the other, of 120 cu. ft. capacity, for storing general produce. A combined ice-making and wet fish storage cabinet (illustrated above) supplements these cold rooms and contributes to the general efficiency of the installation.

* * *

Scots Canners take the Blame

One prominent firm of Scottish canners of meat roll, stewed steak, beef, and many similar lines, have given a lead to other canners in asking the public "Don't Blame Your Grocer" in an announcement they have issued. In this plea they ask the public to forgive the retail trade if they fail to give adequate supplies of the firm's products. Since from the outbreak of war the firm have been working at full pressure on Government orders, supplying all branches of the fighting forces, they state that only a limited amount of their time and plant can be given to civilian needs. That they are doing their utmost to keep the retail trade supplied, even if only in a limited way, is their final remark in a statement which cannot but add to the firm's prestige and goodwill with both the trade and the consumer, who now realises just why he has not got his canned beef as usual.

Flattened Cans help Overseas Buyers

Overseas buyers of cans will find in the flattened can—produced by the Metal Box Company—an ingenious solution of many packaging problems. Of first importance in these days is the fact that supplies of the flattened can take up only *one-fifth* of the space needed to transport cans in made-up form. Thus manufacturers in remote parts of the world can order supplies with the knowledge that their requirements demand a minimum of shipping space.

The principle is simplicity itself. The body of the flattened can is first made in cylindrical form with the side seam properly laid down. This body is then flattened and packed. The bottoms and lids are packed separately in sleeves. Three simple re-forming machines are all that are necessary to restore the can to its cylindrical shape. The cost of the machines is rapidly covered through the savings made in transport costs.

The production of the flattened can is typical of the thoughtful and ingenious approach made by "Metal Box" designers to packaging problems. An ingenuity, incidentally, that is now being shown in the re-styling of existing packagings so that although fewer or simpler processes are used in their manufacture, the packages still retain their old characteristics and most of their peace-time "sales appeal"! In this way, "Metal Box" are enabled to release skilled craftsmen for work of national importance.

Manufacturers exporting from this country can aid the national effort by spreading abroad the now famous slogan—"Britain delivers the Goods". "Metal Box" has designed an attractive metal tablet, size 3½ in. by 3¾ in., incorporating this message and a design in full colour showing the British Lion and the Union Jack. These tablets, ready pierced for tacking on to cases and crates, are available at favourable rates to exporters. Already this simple message has been doing its work—particularly in countries where Germany booked orders but now finds the British blockade very much in existence! The simple message conveyed on the tablets is effective propaganda for British Goods in Overseas Markets.

* * *

Canning Viscous Liquids

Designed for a capacity of 3,600 to 4,920 cans per hour, the "Morton" Filler will fill all sizes of cans up to one pint actual capacity, and will deliver a uniform measured quantity.

The makers, Robert Morton and Co., Ltd., stress the trouble-free and dripless nature of the filling by means of an absolute positive shut-off which avoids drip and waste. Twin and single head machines are made.

* * *

Yeast Cooling Plant

A recent yeast cooling installation in the West of England by Stanelco Products is of considerable interest. The modern refrigerating plant for this purpose incorporates a large water tank approximately 10 ft. by 10 ft. by 2 ft. 6 in., insulated with cork and finished with Portland cement. In the tank is the evaporator coil of copper tubing, and also a special agitator arrangement which is driven by a 1 h.p. motor.

The water in the tank is circulated and maintained at a temperature of 35° F., plus or minus ½° F. Refrigeration for cooling this water is provided by a water-cooled condensing unit, driven by a 3 h.p. motor. This method of cooling the yeast by chilled, sweet water is now generally preferred to cooling by brine, as no harm is done should there be a slight leak in the press. In many cases the dry, cooled yeast is stored in small cabinets with sliding trays, several of which Stanelco have supplied to the brewing trade. During storage at the temperature of 35° F., the yeast remains free from infection, uninfluenced by external factors as well as benefiting by a considerably longer rest, during which weakened cells strengthen, and no autolyses can take place, as would occur if left in open vessels.

* * *

Vacuum Gauge for Low Pressures

For a long time there has been a wide need for an inexpensive vacuum gauge which covers a useful range of low pressures and at the same time is very simple to operate.

Hitherto the only type of this gauge came from abroad and had several disadvantages. W. Edwards and Company (London), Ltd., have been slowly perfecting in their development department an instrument which would obviate known disadvantages and at the same time be a great improvement in design and mechanical perfection on the foreign models. The experiments have been highly successful, and the production of the new model, designated the "Vacustat", which covers a vacuum range of 10 to 0·01 mm. Hg, is about to commence.

The gauge should be of interest to all physicists, chemists and works managers concerned with the applications of vacuum either on the research or manufacturing side.

* * *

New Cap Feed

Pneumatic Scale Corporation, Ltd., is announcing an entirely new type of Cap Feed for use on all Pneumatic Single Head, Two Head and Four Head Automatic Capping Machines. The invention of this new method of feeding caps individually and automatically will greatly reduce production expense for those who use bottle closures which heretofore required special, costly methods of handling. Long skirt plastic closures for bar service liquor bottles, metal caps for catsup and sauce bottles, and many styles of caps too fragile or delicately finished for ordinary machine handling, are only a few of the types of closures for which this new Cap Feed is applicable. Pneumatic's new Cap Feed will also be welcomed by cap manufacturers, since it can be used as an individual unit to feed caps at high speeds to cap lining machines.

Diaries and Calendars

The shortage, in fact almost complete absence, of diaries, calendars and other useful concomitants of the New Year is readily understandable, but those which have arrived have been doubly welcomed.

The diary we have received from Messrs. W. J. Bush and Co., Ltd., was one of those particularly appreciated.

* * *

Pocket Diary, 1941

We have received a very useful pocket diary from the *Meat Trades' Journal*, durably and elegantly bound. In addition to the usual information, there are some useful tables for the meat trade, including tables for the use of meat trade executives. Ample space for memoranda is also included. This diary is still available from the publishers at 3s.

* * *

Marketing of Vegetables

A Departmental Committee has been appointed by the Minister of Food. Its function is "to examine the existing system of marketing fresh vegetables in the United Kingdom and to advise as to what steps can best be taken to ensure an equitable distribution at prices accessible to all classes of the public when supplies are short and to ensure that the maximum quantity is put into human consumption when supplies are abundant".

Mr. L. R. Pym, M.P. (Parliamentary Private Secretary to the Parliamentary Secretary to the Ministry of Food), is chairman of the committee, and the other members are Mr. E. M. H. Lloyd (Principal Assistant Secretary in the Ministry of Food); Major C. R. Dugeon, J.P. (Divisional Food Officer, Eastern 11 Division); and Dr. H. V. Taylor, O.B.E., D.Sc. (Horticultural Commissioner in the Ministry of Agriculture).

* * *

Contributions to Glasgow Hospitals

The employees of Messrs. L. Sterne and Co., Ltd., refrigerating plant and machinery manufacturers and engineers, of Glasgow, have contributed £177 to Glasgow hospitals and charitable institutions as a result of collections made in 1940.

* * *

Livestock Rationing

Rationing feeding stuffs is not easy, and it is complicated by the need to take account of the corn, beans and peas grown by the farmer himself, as well as by the need to encourage milk production, for example, rather than bacon and eggs.

No farmer could be expected to carry the whole scheme in his head, and he need not try. The Ministry of Agriculture has just issued a free leaflet, Grow-more No. 52, that sets out the scheme simply but in full. Every farmer will receive a copy of the leaflet with his livestock ration coupons. If any require further copies, they can be obtained from the Ministry of Agriculture, 23-25, Soho Square, London, W.1.

Synthetic Sausage Casings

A British-made synthetic sausage casing, which is claimed to be not a substitute but an improvement upon the animal products such as middles, weasands and bladders, as it is characterised by perfect uniformity, is the "Vita-Natcherlyk". Its freedom from pinholes reduces to a minimum the losses of fat and meat in the boiling and smoking processes. Some comparative figures are as follows:

	Boiling Loss.	*Smoking Loss.*	*Total.*
	lb.	lb.	lb.
Sheep weasands	7½	3	10½
Fatends ...	8½	3	11½
Vita-Natcherlyk	1-1½	2½	3½-4

This saving is important in peacetime, but doubly so just now.

Vita-Natcherlyk may be used for boiled and smoked sausages; it closes well with the filling, which ensures increased preservation and the maintenance of the fresh taste.

* * *

Import Licensing Requirements

The Board of Trade announced that from February 5, 1941, separate licences were required for the importation from Eire of (1) Biscuits and (2) Flax Straw, except in respect of goods which are proved to the satisfaction of H.M. Customs and Excise to have been despatched to the United Kingdom before February 5, 1941, and which are imported into this country before April 5, 1941.

Applications for licences to import Biscuits should be submitted (in duplicate) to the Ministry of Food, Mount Stewart Hotel, Colwyn Bay.

Applications in respect of Flax Straw should be submitted (in duplicate) to the Flax Control, Washington Hotel, City Road, Chester.

* * *

Examinations in Food Hygiene

Examinations for Inspectors of Meat and Other Foods and in Food Hygiene will be held by the Royal Sanitary Institute in London, May 16-17, in Leeds, May 30-31, 1941, and in London, January 16-17, 1942. Applications for entry should reach the Institute, 90, Buckingham Palace Road, London, S.W.1, as soon as possible and not later than 21 days before the examination.

* * *

Royal Society Officers and Council

The following is a list of those elected as Officers and Council of the Royal Society at the Anniversary Meeting:

President.—Sir Henry Dale.

Treasurer.—Mr. T. R. Merton.

Secretaries.—Professor A. V. Hill, Professor A. C. G. Egerton.

Foreign Secretary.—Sir Henry Tizard.

Other Members of Council.—Professor P. M. S. Blackett, Professor F. T. Brooks, Dr. C. G. Darwin, Dr. A. N. Drury, Dr. H. J. Gough, Professor J. B. S. Haldane, Professor I. M. Heilbron, Professor O. T. Jones, Professor R. T. Leiper, Sir Thomas Middleton, Professor L. J. Mordell, Dr. C. F. A. Pantin, Professor H. S. Raper, Professor E. K. Rideal, Dr. F. J. W. Roughton, Professor A. M. Tyndall.

Sugar for Bees

The Ministry of Food reminds beekeepers that permits for sugar are obtainable at the rate of 10 lb. per colony for the purpose of winter and spring feeding.

Applicants for permits must produce to the Local Food Executive Officer satisfactory evidence of the number of colonies in their possession.

* * *

Seed Potato Supplies

A very considerable increase in the acreage under potatoes will be required this year, and there will, therefore, be an abnormal demand for supplies of seed potatoes. Growers are accordingly urged to lose no time in placing with their usual suppliers their orders for the seed they will require. The demand is already so large that some growers may experience difficulty in obtaining supplies of the particular varieties they wish to plant. There are, however, still available good supplies of seed of Kerr's Pink, Redskin, Up-to-Date, Arran Victory and Arran Banner. These varieties are widely grown either in Scotland or Ireland, but are less popular in this country. Growers unable to secure seed through their usual suppliers should communicate with the Area Superviser of Potato Control.

* * *

Reconstruction of Offices

Messrs. James MacGregor, Ltd., millers and grain merchants, of Lanarkshire, have had plans prepared for a scheme of reconstruction and additions to their offices.

* * *

The Confectioners' Benevolent Fund

Mr. Alfred Handisyde has recently issued the twenty-third annual appeal on behalf of the aged poor of the confectionery trade.

He says that in spite of the many calls being made throughout the country, it is essential that the confectionery trade should not overlook its responsibilities to its aged poor and the many members of the trade, who apart from those bombed out of business are very sadly reduced financially as a result of the severe rationing of supplies, evacuation and other causes. During the past financial year £2,026 5s. was expended in pensions, and, in addition, timely aid was rendered to other members of the trade, which necessitated an expenditure of £796. Mr. Handisyde asks that donations, large or small, should be sent to the President or Treasurer direct, or through Secretaries of Local Committees.

* * *

The Gear Meat Company, Ltd.

We are advised that the name of the Gear Meat Preserving and Freezing Company of New Zealand, Ltd., has been altered and abbreviated to the Gear Meat Company, Ltd., and that the London address is now Cunard House, 88, Leadenhall Street, London, E.C.3. Telephone: Avenue 1270.

CHANGES OF ADDRESS

Allardyse Palmer Ltd.

Allardyce Palmer, Ltd., advise that their address is now "Woodside", Icklingham Road, Cobham, Surrey, to which all communications should be addressed. A small staff will be retained at the London office, Wheatsheaf House, Carmelite Street, E.C. 4, to deal only with matters of the utmost urgency, and it is especially requested that only such matters be referred there.

* * *

Mr. Maurice Sampson

Mr. Maurice Sampson informs us that the address and telephone number of the Press and Publicity Department of the Red Cross and St. John War Organisation have been changed to 23, Carlton House Terrace, S.W. 1; telephone number, Abbey 4781.

* * *

Samuel Jones and Co., Ltd.

Messrs. Samuel Jones and Co., Ltd., wish to inform their friends that owing to enemy action their address will now be Peckham Grove, S.E. 15. Their Paper Warehouse is at 3a, Upper Thames Street, E.C. 4, and the Export Department will be operating from 30-34, New Bridge Street, E.C. 4.

The Company is carrying on with all its activities and they hope that their friends will be indulgent if they are caused any slight inconvenience or delays.

* * *

Gummed Paper Stocks

Samuel Jones and Co., Ltd., advise that for the convenience of their friends who wish to collect urgent supplies of gummed paper, arrangements have now been made to carry regular stocks of their White and Coloured Gummed Papers at 3a, Upper Thames Street—in the heart of the City, a few doors from Blackfriars Station.

This service was rendered in the past from their Bridewell Place address, which was recently destroyed by fire.

* * *

The Ryvita Co., Ltd.

This firm advises that, owing to enemy action, its factory has been destroyed. Happily, practically all the plant remains intact and will be re-installed, although it will be some weeks before production will be resumed. In the meantime communications should be addressed to: The Ryvita Co., Ltd., 292, Tadcaster Road, York.

Soviet Vitamin Factory

A big factory for the production of vitamins and carotin—a valuable crystalline substance used in surgery—is being built in the town of Dmitrovsk in the Kursk Province.

The factory is designed to produce annually 250,000,000 doses of concentrates of vitamin C from briar roses and 58,000 quarts of concentrates of vitamin C from black currants, as well as 66 lbs. of carotin. It will obtain its raw materials from the collective farms of the Dmitrovsk and neighbouring districts.

South African Canned Fruit

Exports of canned fruits—which Lord Woolton has called Britain's "Iron Rations"—from the Western Provinces of South Africa rose by £250,000 in 1939 compared with total exports for the past year.

Compared with 1937, when jam and other canned goods represented only £18,465 in the export total, £338,427 worth were exported in the first nine months of last year.

These figures have given the farmers renewed hope.

* * *

Distilleries Restarted

Speyside and Highland distilleries resumed whisky-making in the first week of the New Year, the necessary licences permitting the manufacture of whisky having been received from the Ministry of Food. The season is to be limited to three months, and distillers are not to be allowed to buy any imported grain, so that farmers in the North of Scotland will have a war-time monopoly of the malting business.

A leading distiller stated that the cut in production since two seasons ago need raise no fears of a whisky shortage. Scotland had started the war with an estimated stock of 140,000,000 gallons—the biggest quantity ever held and enough to cover all requirements both home and export for years ahead.

A shortage of staffs may be experienced at some distilleries, where skilled men have been called to the Forces, while other employees, thrown out of work in the quiet season, have secured employment with local Government contractors. In a number of cases old-age pensioners formerly engaged in the industry will be brought back.

* * *

OBITUARY

Donald Ward Cutler, Head of the Microbiological Department at the Rothamsted Experimental Station, died recently at Harpenden after a short attack of pneumonia. He had graduated at Queens' College, Cambridge, taking a 1st Class in Part II of the Natural Science Tripos, with Zoology as his chief subject, then investigated fish scales at the Marine Biological Station, Plymouth for about two years. Meanwhile the last war had broken out, and he proceeded to the Manchester University as a demonstrator, carrying out investigations on the protozoa of termites. He soon, however, transferred most of his attention to the Pathological Department for the Manchester War Hospitals, where he worked on amœbic dysentery, having been judged ineligible for active service owing to a weak heart.

In 1919 he was appointed to the new Microbiological Department at Rothamsted, and in a series of important investigations jointly with Miss L. M. Crump he cleared up many of the problems that had been raised in connection with the protozoa of the soil. Subsequently he and his staff undertook an important series of studies for the Department of Scientific and Industrial Research on the purification of effluents from sugar beet and milk factories. The work on soil organisms, however, continued steadily and resulted in an accumulation of a great mass of new knowledge on the subject.

He was widely interested in biological problems, and his two books are well known to students—*Heredity, Evolution and Adaptation* and *Some Problems in Soil Microbiology*. In addition, he was joint editor of a series of Biological Monographs and Manuals published by Oliver and Boyd, and, for a time, of the *Annals of Applied Biology*. He was also an active member of the Councils of the Eugenics Society and the British Social Hygiene Society.

He was not only a good investigator but a very successful lecturer on his subject, not only to strictly scientific audiences but to a wider range of hearers. He was much interested in the Workers Educational Association and, as far as his time permitted, lectured for them.

He will long be remembered for his attractive personality and his gift of invoking the loyal support of those who worked with him.

* * *

Midland Bank, Limited

In view of the circumstances in which the annual meeting of shareholders was held, on January 30, the Chairman, the Right Hon. R. McKenna, did not follow the custom of delivering a speech. In place thereof a statement, from which extracts appear below, has been circulated to shareholders.

On the balance sheet a record figure is shown for current, deposit and other accounts. The growth of deposits has led to suggestions that the banks are making large and undue profits out of what has been described as "costless credit". But for banks such a thing as costless credit does not exist. The banks pay for all deposits placed with them, partly in interest and partly in service. Of the two forms of payment the cost of service is ordinarily much the greater, and has been substantially increased of late by difficulties arising from the war. On the other hand, what the banks have been able to earn on the additional money entrusted to them is readily ascertainable from their balance sheets.

Commenting on the dividend for the year, the statement reads:

The apparent high rate of 16 per cent. has often given rise to the misconception that banks earn excessive profits. But on what is the dividend paid? It is reckoned on the paid-up capital, which by no means represents the whole capital funds in the bank owned by the shareholders. With exceptions insignificant in amount in relation to the present capital, the shares have always been issued at a premium, which has been placed to reserve. Moreover, during the hundred years and more of the bank's existence savings out of profits have been made, quite small in annual amounts, but large in the aggregate, which have led to a steady growth of the true capital funds. The yield of something over 4 per cent. on the market value of the paid-up capital more accurately represents the return the shareholder receives on his actual capital in the bank than the dividend rate of 16 per cent.

INFORMATION AND ADVICE

Discoloration of Beef during Curing—Mincemeat—Saccharin—Regulating Humidity in a Factory—Information Supplied—Information Required.

Discoloration of Beef during Curing

6,904. *We should be very grateful for your advice in dealing with a problem which is causing us some concern. On curing beef with a pickle which includes sodium chloride and sodium nitrite in the pure form, we find that there is a tendency for a part of the meat to turn a green colour. Although the larger part of the meat, both in its raw state and on cooking, is the required red colour, there are portions of it, especially in those parts which have had contact with the air, which assume this most undesirable colour. Even when the meat is absolutely fresh this feature occurs.* (Lancs.)

We think that you will find your difficulty entirely overcome if you do not allow the meat, during pickling, to come into contact with air or dry off, and the best way to do this is to make a frame of wood consisting of laths with spaces between them and just fitting inside the barrels or tanks. Put this on top of the meat, then put a weight such as a large stone on top. Be careful, if you use new wood for the frames, that you thoroughly boil it in water with a little soda in it until there is no smell or taste of resin. If you omit to do this, you will find that the wood may give a resinous taste to the meat. Another way, of course, is to turn the meat over at short intervals—say, every 3 hours—and this is a good thing to do in any case, as it hastens the pickling.

Mincemeat

6,680. *We would like to manufacture our own mincemeat. Will you kindly let us have a recipe? We prefer it without spices.* (Lincs.)

Although most recipes for mincemeat include spice, the following recipe may serve as a basis for experiment :

Apples	40 lbs.
Currants	80 ,,
Brown sugar	56 ,,
Suet	20 ,,
Sultana raisins	15 ,,
Orange peel	2 ,,
Lemon peel	3 ,,
Citron peel	3 ,,

Chop all ingredients finely, place in a cask and stir well. Then pack and process No. 1 package 40 minutes at 210° F.

Saccharin

6,678. *We should be obliged if you would kindly supply us with the names of a few firms who manufacture saccharin. At the same time we should like to know whether there are any regulations concerning the use of the above substance in food products, and it is possible you may be able to supply us with this information or advise us where it can be obtained.* (Middlesex.)

We think that at the moment you may be finding some difficulty in regard to the supply of saccharin, but we take it that what you require is a sugar substitute, and in this connection you might find " Sugarol " what you require. There are no restrictions on the use of saccharin and Sugarol in food products.

Names of firms were supplied.

Regulating Humidity in a Factory

7,221. *Could you advise us as to the least expensive way to regulate humidity in a factory? Our winter season here is the rainy season, and we are interested at that time of the year to keep the air in the factory as dry as possible.* (South Africa.)

It is impossible to offer any really reasonable advice on this subject without being in possession of the layout of the factory, and all that we can do, therefore, is to suggest that when the outside temperature is particularly high means are adopted to raise the temperature of the dry bulb in the factory itself. This will have the effect of reducing the internal relative humidity. Actually the only really satisfactory method to adopt in a case of this nature is for the problem to be put in front of a firm of air-conditioning engineers, who in turn will probably insist that vents to the factory should be closed and that a proper conditioning plant be installed, whereby the excessive moisture in the air is condensed and deposited in the air washer by reducing the temperature of the dew point, then heating the treated air to somewhere in the region of about 70° F.

Names of air-conditioning concerns were given.

Information Supplied

6,628. *We should like to be put in touch with the manufacturers of a power-driven machine for moulding the dough into the required shape in the A1 tall cans (16 ozs.) for steak and kidney pudding.* (Liverpool.)

Names of suppliers were given.

6,626. *According to the new Government Jam Order, cold jam is to be tested for soluble solid content by means of a " refractometer ". Could you let us know where we could purchase one of these from, and give us any information regarding the same, and the method of the test?* (London.)

This was done.

6,624. *We should be pleased if you could inform us regarding dealers in second-hand or re-conditioned Sifter and Mixing Machines.* (London.)

Names of firms were given.

6,641. *I should be very grateful if you could advise me names of manufacturers of Milk Sugar.* (Cheshire.)

This was done.

6,671. *We should be very much obliged if you would give us the name and address of the various manufacturers of metal caps to fix on jam jars.* (Bucks.)

Names of suppliers were given.

7,114. *We shall be glad if you will indicate to us possible sources of pure crystalline mono-sodium glutamate.* (Paisley.)

This was done.

7,100. *Manufacturing friends of ours are on the look-out for either new or second-hand cube-pressing machines. As no doubt you are in touch with all the English manufacturers of this type of machinery and also possible sources of supply for second-hand machines, we shall be obliged if you would let us have this information.* (Bucks.)

The manufacturers of cubing machines and also possible sources of supply for second-hand machinery were given.

Information Required

7,134. *We shall be glad if you can give us any assistance as regards a suitable recipe for egg substitute.* (Liverpool.)

7,204. *We shall be glad if you can advise us as to a likely source for the supply of locust bean meal. We have an enquiry for locust bean gum, and we ourselves have never heard of gum made from locust bean, but we presume that what is meant is finely ground quality meal milled from the locust bean.* (Edinburgh.)

Gum made from locust bean is not finely ground meal milled from the bean, but an actual gum extracted from it. It was the subject of the U.S. Patent 2,007,218 about the year 1935.

Perhaps some of our readers can indicate the present source of supply, if any.

7,232. *We shall be glad if you would give us the name of people who would supply us with wheat starch and gluten.* (Liverpool.)

7,257. *We shall be glad if you can give us some information regarding " Taubeta Jelly ". The substance, as we have it, is a powder which on mixing with water and heating gives a jelly. Can you tell us* (a) *maker's name,* (b) *uses to which the jelly can be put?* (Leicester.)

RECENT PATENTS

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents", and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Abstracts of Recent Specifications

Group Abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, either sheet by sheet as issued on payment of a subscription of 5s. per Group Volume, or in bound volumes price 2s. each.

Improvements in and Relating to Canning

The invention relates to improvements in and relating to canning, and it relates more particularly to the canning of such foodstuffs, especially, but not necessarily exclusively, fruits, as contain fruit and/or vegetable acids, and/or corrosive pigments, such, for example, as anthocyanin pigments.

A serious difficulty has arisen in the canning of fruits owing to the frequent occurrence of what are known as "hydrogen swells". These are due to the corrosive action of the acids or pigments contained in the fruit, which attack the tin of the tinplate, liberating hydrogen and thus creating a pressure within the sealed tin which causes the latter to swell or bulge; owing to the porosity of tinplate, iron also is attacked.

The use of various substances intended to act as corrosion inhibitors has been proposed, and accounts of much of this work will be found in Special Reports Nos. 40 and 44, by Morris and Bryan, issued by the Food Investigation Board of the Department of Scientific and Industrial Research. In these reports reference is made, amongst other subsances, to an experiment with pectin as an intended inhibitor, but the results obtained do not appear to have been considered satisfactory or encouraging, and the authors state that the pectin employed was not pure.

Practical canning trials have also been carried out by Hirst at Campden with agar-agar, pectin, and gelatin. Agar-agar up to a concentration of 0·1 per cent. was found to have no appreciable effect in inhibiting corrosion when added to loganberries, sweet cherries and plums. Pectin, which is naturally present in nearly all fruits, was not found to produce beneficial results in canning when added to loganberries or sweet cherries at a concentration of 0·1 per cent. Gelatin was found to inhibit corrosion at all acidities in amounts of 0·2 to 0·4 per cent.

It has been found, however, that pectin can be employed with considerable success as a corrosion inhibitor in the canning of foodstuffs of the kind described, especially fruits, if the canning liquor contains a concentration of pectin of the order of 0·25 per cent. in terms of high-grade pectin or more, and preferably an amount approaching but less than that at which with the *p*H and sugar content of the liquor gelling would occur.

The invention provides a method of treating fruits, vegetables, or other foodstuffs containing fruit and/or vegetable acids and/or corrosive pigments, for canning, including the step of bringing the concentration of pectin in the liquor in which the material is to be canned, or a component part thereof, to a value such that in the final liquor the pectin concentration is not below 0·25 per cent. in terms of high-grade pectin, or higher, and is less than, but preferably near, that at which with the *p*H value and sugar concentration of the final liquor gelling would occur. Naturally in arriving at the desirable concentration of pectin due regard must be paid to the palatability of the liquor.

The following table gives concentrations of pectin and sugar at which gelling will only just take pace in the presence of acid. Making due allowance for the pectin in the fruit, it is possible to arrange the pectin concentration well below the gelling point and still to be sure of inhibiting corrosion.

0·75 per cent. of pectin will not gell with any concentration of sugar.
0·9 per cent. of pectin will just gell with 65 per cent. of sugar.
1·0 per cent. of pectin will just gell with 62 per cent. of sugar.
1·25 per cent. of pectin will just gell with 54 per cent. of sugar.
1·5 per cent. of pectin will just gell with 52 per cent. of sugar.
1·75 per cent. of pectin will just gell with 51 per cent. of sugar.

The term "high-grade pectin" as used herein is intended to mean pectin of about 100 jellying grade, and it will be understood that where pectins of different grades are employed the quantities should be suitably adjusted.

In general it will be found convenient to operate at a *p*H of about or less than 3.

A thin but tenacious film is formed on the surface of the can which is not readily removed by boiling water or hot dilute acid solution, and which appears to protect the metal from corrosion, and the corrosion-inhibiting action of pectin in the process according to the present invention is largely, if not wholly, due to the formation of such films owing to the ability of pectin to form gels with sugar in a medium of suitable *p*H value.

The invention therefore provides a method of canning fruit, vegetables, or other foodstuffs containing fruit and/or vegetable acids and/or corrosive pigments in canning liquors comprising sugar or syrup, including the step of bringing the pectin concentration of the canning liquor to such a value that a protective film is formed on the inner surface of the can. The required pectin concentration can be achieved by the addition of pectin to the pack or to the liquor, or it may be derived wholly or in part from the fruit itself by extraction.

524,877. Suzanne Mabel Lavinia Whitfield Tritton.

Latest Patent Applications

13721. CRITCHLEY, H.: Egg substitute. Sept. 2.
13740. AKTIESELSKABET DANSK GAERINGS-INDUSTRI: Production of cheese. Sept. 2.
13741. AKTIESELSKABET DANSK GAERINGS-INDUSTRI.: Production of preserves. Sept. 2.
14445. DOCKING, A., and BAIRD AND SONS, LTD., H.: Apparatus for roasting cereal products. Sept. 23.
14665. JENKINS, G. N., and CAMBIO PRODUCTS, LTD.: Preparation of concentrated extracts of active physiological principles from liver tissue. Sept. 27.
15014. ROGERS, J. H., ROGERS, F. H., and HUZENLAUB, E. G.: Treatment of cereals. Oct. 8.
15073. HARBER, L. S., and BAKER PERKINS, LTD.: Manufacture of bread. Oct. 9.
15679. CALDWELL, W. A., and IMPERIAL CHEMICAL INDUSTRIES, LTD.: Canned foods, etc. Oct. 25.

Specifications Published

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

526,389. DISTILLATION PRODUCTS, INC.: Preparation of vitamin compositions.
526,474. POTATO CORPORATION OF IDAHO: Treatment of potatoes to produce dried mashed potato.
526,516. BARNETT, C. H., and JACKSON, T. E.: Machines or apparatus for marking pies.
526,952. ROMWALTER, A., KIRALY, S., FAI, G., and RACZ, M.: Preserving fruit, vegetables, greens and eggs.
527,011. AMERICAN CAN CO.: Method of and apparatus for canning food products.
527,047. WESSANEN'S KONINKLIJKE FABRIEKEN N.V.: Treatment of cereals preparatory to milling.
527,176. COOPER, J. A.: Machine for manufacturing composite foodstuffs by extrusion.

TRADE MARKS

The list of trade marks of interest to readers has been selected from the "Official Trade Marks Journal" and is published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

CLIX.—608,371. Biscuits (other than biscuits for animals), but not including chocolate or toffee biscuits. **Weston Foods, Ltd.,** 309, Thames House, Millbank, London, S.W. 1; and 504, Buckingham Avenue, Slough, Buckinghamshire. (By Consent.)
Proceedings under Section 29 (1) (b).

IN TOWN TO-NIGHT.—608,372. Biscuits (other than biscuits for animals). **Weston Foods, Ltd.,** 309, Thames House, Millbank, London, S.W. 1; and 504, Buckingham Avenue, Slough, Buckinghamshire.
Proceeding under Section 29 (1) (b).

BAND WAGGON.—608,373. Confectionery and bread; and biscuits and cake (other than biscuits and cake for animals). **Weston Foods, Ltd.,** 309, Thames House, Millbank, London, S.W. 1; and 504, Buckingham Avenue, Slough, Buckinghamshire. Oct. 2.
Proceeding under Section 29 (1) (b).

NEW COMPANIES

Manus British Company, Limited. (364317.) To carry on the bus. of agents and brokers for, mnfrs. of and dlrs. in separators, boilers, and dairy farming and agricultural machinery, etc. Nom. cap.: £100 in £1 shares. Dirs.: To be appointed by the subs. Subs.: Maureen B. Lawless, 30, Charlwood Street, S.W. 1 (secy.); J. B. Wrightson, The Spinney, Beech Hill Avenue, Hadley Wood (clk.).

Food Trade Supplies, Limited. (364491.) Rutland Chambers, 12, St. Peter's Gate, Nottingham. Nom. cap.: £100 in £1 shares. Dirs.: R. H. Rose, Bridewell, Wyddial Road, Buntingford, Herts; W. A. Hemmings, 201, Dartford Road, Dartford; C. E. Taylor, The Kyles, Oxclose Lane, Arnold, near Nottingham.

Caro Cereals, Limited. (364503.) 22, High Street, Bristol, 1. To carry on bus. of cereal and produce brokers, etc. Nom. cap.: £100 in £1 shares. Dirs.: E. H. Rouse, Florence F. Rouse, and Mabel F. Rouse, all of Stradbroke Lodge, Bleadon, Som.

A. B. Woodcock, Limited. (364624.) To take over a bus. of pastrycook, etc., cd. on at Peterborough and elsewhere. Nom. cap.: £15,000 in £1 shares. Permt. dirs.: A. B. Woodcock, The Nest, Westwood Park Road, Peterborough; H. Woodcock, 113, Bishop's Road, Peterborough; Violet Woodcock, address not stated.